

# SEQUENCE LISTING

<110> THE GOVERNMENT OF THE UNITED STATES OF AMERICA AS  
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 HUMAN SERVICES  
 Collins, Peter L.  
 Biacchesi, Stephane  
 Buchholz, Ursula  
 Skiadopoulos, Mario H.  
 Murphy, Brian R.

<120> RECOMBINANT HUMAN METAPNEUMOVIRUS AND ITS USE

<130> 4239-67784

<150> US 60/451,119

<151> 2003-02-28

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<160> 36

<170> PatentIn version 3.2

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<212> DNA

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 agcagttgag atcagctgaa ttgcatgaaa taccttggat tgtcaatgcc gaagggtgatt 12540  
 tggttgagat caagtcaatt aaaatctatt tgcaactgat agaacaaagc ttatttttaa 12600  
 gaataactgt tttgaactat acagatatgg cacatgctct cacacgatta atcagaaaga 12660  
 agttaatgtg tgataatgca ctgttaaccc caatttcac cccaatgggt aacttaactc 12720  
 aagttattga tcccacaaca caattagatt acttcccaa gataacattc gaaaggctaa 12780  
 aaaattatga cacaagttca aattatgcta aagggaagct aacaagaaat tacatgatac 12840  
 tattgccatg gcagcatgtt aatagatata actttgtctt tagttctact ggatgtaaag 12900  
 ttagtctgaa aacatgtatt ggaaaactta tgaaagacct aaatcctaaa gttttgtact 12960  
 ttattggaga aggagcagga aattggatgg ccagaacagc atgtgaatat cctgatatta 13020  
 aatttgata tagaagtctg aaagatgacc ttgatcatca ttatcctctg gaataccaga 13080  
 gagtgatagg tgaattaagc agaatcatag atagtgggtga aggactttca atggaaacaa 13140  
 cagacgcaac tcaaaaaact cattgggatt tgatacacag ggtaagcaaa gatgctttat 13200  
 taataacttt atgtgatgca gaatttaagg acagagatga tttttttaag atggtaattc 13260

tatggagaaa acatgtatta tcatgcagaa ttgcactac ttatgggacg gacctctatt 13320  
 tattegcaaa gtatcatgct aaagactgca atgtaaaatt accttttttt gtgagatcag 13380  
 ttgctacttt cattatgcag ggtagtaagc tgcaggttc agaatgctac atactcttaa 13440  
 cactaggcca ccacaacagt ttaccttgcc atggagaaat acaaaattct aagatgaaaa 13500  
 tagcagtgtg taatgatttt tatgtgcaa aaaaactcga caataaatca attgaagcta 13560  
 attgtaaatc acttttgtca gggctaagaa tacctataaa taagaaggaa ctagatagac 13620  
 agagaagatt attaacacta caaagcaatc attcttctgt agcaacagtt ggcggtagca 13680  
 agatcataga gtctaagtgg ttaacaaaca aagcaagtac aataattgat tggttagaac 13740  
 atattttaaa ttctccaaag ggcgaattaa attatgattt ttttgaagca ttggagaaca 13800  
 cttaccctaa tatgattaaa ctaatagata acttagggaa tgcagagatt aaaaaactga 13860  
 tcaaagtaac aggatacatg cttgtaagta aaaaatgaaa aatgatgaag atgacaaaat 13920  
 agatgacaac ttcatactat tctaaattaa ttatttgatt atgcaattat atgatagtta 13980  
 attaaaatta aaaattaaaa atcaaaagtt aaaattttaa acctatcatt aagtttatta 14040  
 aaaataagaa attataattg aatgtatacg gtttttttgc cgt 14083

<210> 4  
 <211> 187  
 <212> PRT  
 <213> human metapneumovirus

<400> 4

Met Ser Arg Lys Ala Pro Cys Lys Tyr Glu Val Arg Gly Lys Cys Asn  
 1 5 10 15

Arg Gly Ser Glu Cys Lys Phe Asn His Asn Tyr Trp Ser Trp Pro Asp  
 20 25 30

Arg Tyr Leu Leu Ile Arg Ser Asn Tyr Leu Leu Asn Gln Leu Leu Arg  
 35 40 45

Asn Thr Asp Arg Ala Asp Gly Leu Ser Ile Ile Ser Gly Ala Gly Arg  
 50 55 60

Glu Asp Arg Thr Gln Asp Phe Val Leu Gly Ser Thr Asn Val Val Gln  
 65 70 75 80

Gly Tyr Ile Asp Asp Asn Gln Ser Ile Thr Lys Ala Ala Ala Cys Tyr  
 85 90 95



Ser Leu His Asn Ile Ile Lys Gln Leu Gln Glu Val Glu Val Arg Gln  
100 105 110

Ala Arg Asp Ser Lys Leu Ser Asp Ser Lys His Val Ala Leu His Asn  
115 120 125

Leu Ile Leu Ser Tyr Met Glu Met Ser Lys Thr Pro Ala Ser Leu Ile  
130 135 140

Asn Asn Leu Lys Arg Leu Pro Arg Glu Lys Leu Lys Lys Leu Ala Lys  
145 150 155 160

Leu Ile Ile Asp Leu Ser Ala Gly Ala Asp Asn Asp Ser Ser Tyr Ala  
165 170 175

Leu Gln Asp Ser Glu Ser Ile Asn Gln Val Gln  
180 185

<210> 5  
<211> 179  
<212> PRT  
<213> human metapneumovirus

<400> 5

Met Ile Thr Leu Asp Val Ile Lys Ser Asp Gly Ser Ser Lys Thr Cys  
1 5 10 15

Thr His Leu Lys Lys Ile Ile Lys Asp His Ser Gly Lys Val Leu Ile  
20 25 30

Ala Leu Lys Leu Ile Leu Ala Leu Leu Thr Phe Phe Thr Ile Thr Ile  
35 40 45

Thr Ile Asn Tyr Ile Lys Val Glu Asn Asn Leu Gln Ile Cys Gln Ser  
50 55 60

Lys Thr Glu Ser Asp Lys Glu Asp Ser Pro Ser Asn Thr Thr Ser Val  
65 70 75 80

Thr Thr Lys Thr Thr Leu Asp His Asp Ile Thr Gln Tyr Phe Lys Arg  
85 90 95

Leu Ile Gln Arg Tyr Thr Asp Ser Val Ile Asn Lys Asp Thr Cys Trp  
100 105 110

Lys Ile Ser Arg Asn Gln Cys Thr Asn Ile Thr Thr Tyr Lys Phe Leu  
25

115

120

125

Cys Phe Lys Pro Glu Asp Ser Lys Ile Asn Ser Cys Asp Arg Leu Thr  
 130 135 140

Asp Leu Cys Arg Asn Lys Ser Lys Ser Ala Ala Glu Ala Tyr His Thr  
 145 150 155 160

Val Glu Cys His Cys Ile Tyr Thr Ile Glu Trp Lys Cys Tyr His His  
 165 170 175

Ser Ile Asp

<210> 6  
 <211> 219  
 <212> PRT  
 <213> human metapneumovirus

<400> 6

Met Glu Val Lys Val Glu Asn Ile Arg Ala Ile Asp Met Leu Lys Ala  
 1 5 10 15

Arg Val Lys Asn Arg Val Ala Arg Ser Lys Cys Phe Lys Asn Ala Ser  
 20 25 30

Leu Ile Leu Ile Gly Ile Thr Thr Leu Ser Ile Ala Leu Asn Ile Tyr  
 35 40 45

Leu Ile Ile Asn Tyr Thr Ile Gln Lys Thr Ser Ser Glu Ser Glu His  
 50 55 60

His Thr Ser Ser Pro Pro Thr Glu Ser Asn Lys Glu Ala Ser Thr Ile  
 65 70 75 80

Ser Thr Asp Asn Pro Asp Ile Asn Pro Asn Ser Gln His Pro Thr Gln  
 85 90 95

Gln Ser Thr Glu Asn Pro Thr Leu Asn Pro Ala Ala Ser Val Ser Pro  
 100 105 110

Ser Glu Thr Glu Pro Ala Ser Thr Pro Asp Thr Thr Asn Arg Leu Ser  
 115 120 125

Ser Val Asp Arg Ser Thr Ala Gln Pro Ser Glu Ser Arg Thr Lys Thr  
 130 135 140

Lys Pro Thr Val His Thr Arg Asn Asn Pro Ser Thr Ala Ser Ser Thr  
 145 150 155 160

Gln Ser Pro Pro Arg Ala Thr Thr Lys Ala Ile Arg Arg Ala Thr Thr  
 165 170 175

Phe Arg Met Ser Ser Thr Gly Lys Arg Pro Thr Thr Thr Ser Val Gln  
 180 185 190

Ser Asp Ser Ser Thr Thr Thr Gln Asn His Glu Glu Thr Gly Ser Ala  
 195 200 205

Asn Pro Gln Ala Ser Val Ser Thr Met Gln Asn  
 210 215

<210> 7  
 <211> 2005  
 <212> PRT  
 <213> human metapneumovirus

<400> 7

Met Asp Pro Leu Asn Glu Ser Thr Val Asn Val Tyr Leu Pro Asp Ser  
 1 5 10 15

Tyr Leu Lys Gly Val Ile Ser Phe Ser Glu Thr Asn Ala Ile Gly Ser  
 20 25 30

Cys Leu Leu Lys Arg Pro Tyr Leu Lys Asn Asp Asn Thr Ala Lys Val  
 35 40 45

Ala Ile Glu Asn Pro Val Ile Glu His Val Arg Leu Lys Asn Ala Val  
 50 55 60

Asn Ser Lys Met Lys Ile Ser Asp Tyr Lys Val Val Glu Pro Val Asn  
 65 70 75 80

Met Gln His Glu Ile Met Lys Asn Val His Ser Cys Glu Leu Thr Leu  
 85 90 95

Leu Lys Gln Phe Leu Thr Arg Ser Lys Asn Ile Ser Thr Leu Lys Leu  
 100 105 110

Asn Met Ile Cys Asp Trp Leu Gln Leu Lys Ser Thr Ser Asp Asp Thr  
 115 120 125

Ser Ile Leu Ser Phe Ile Asp Val Glu Phe Ile Pro Ser Trp Val Ser  
 130 135 140

Asn Trp Phe Ser Asn Trp Tyr Asn Leu Asn Lys Leu Ile Leu Glu Phe  
 145 150 155 160

Arg Arg Glu Glu Val Ile Arg Thr Gly Ser Ile Leu Cys Arg Ser Leu  
 165 170 175

Gly Lys Leu Val Phe Ile Val Ser Ser Tyr Gly Cys Ile Val Lys Ser  
 180 185 190

Asn Lys Ser Lys Arg Val Ser Phe Phe Thr Tyr Asn Gln Leu Leu Thr  
 195 200 205

Trp Lys Asp Val Met Leu Ser Arg Phe Asn Ala Asn Phe Cys Ile Trp  
 210 215 220

Val Ser Asn Ser Leu Asn Glu Asn Gln Glu Gly Leu Gly Leu Arg Ser  
 225 230 235 240

Asn Leu Gln Gly Met Leu Thr Asn Lys Leu Tyr Glu Thr Val Asp Tyr  
 245 250 255

Met Leu Ser Leu Cys Cys Asn Glu Gly Phe Ser Leu Val Lys Glu Phe  
 260 265 270

Glu Gly Phe Ile Met Ser Glu Ile Leu Arg Ile Thr Glu His Ala Gln  
 275 280 285

Phe Ser Thr Arg Phe Arg Asn Thr Leu Leu Asn Gly Leu Thr Asp Gln  
 290 295 300

Leu Thr Lys Leu Lys Asn Lys Asn Arg Leu Arg Val His Ser Thr Val  
 305 310 315 320

Leu Glu Asn Asn Asp Tyr Pro Met Tyr Glu Val Val Leu Lys Leu Leu  
 325 330 335

Gly Asp Thr Leu Arg Cys Ile Lys Leu Leu Ile Asn Lys Asn Leu Glu  
 340 345 350

Asn Ala Ala Glu Leu Tyr Tyr Ile Phe Arg Ile Phe Gly His Pro Met  
 355 360 365

Val Asp Glu Arg Asp Ala Met Asp Ala Val Lys Leu Asn Asn Glu Ile  
 370 375 380

Thr Lys Ile Leu Arg Leu Glu Ser Leu Thr Glu Leu Arg Gly Ala Phe  
 385 390 395 400

Ile Leu Arg Ile Ile Lys Gly Phe Val Asp Asn Asn Lys Arg Trp Pro  
 405 410 415

Lys Ile Lys Asn Leu Lys Val Leu Ser Lys Arg Trp Thr Met Tyr Phe  
 420 425 430

Lys Ala Lys Asn Tyr Pro Ser Gln Leu Glu Leu Ser Glu Gln Asp Phe  
 435 440 445

Leu Glu Leu Ala Ala Ile Gln Phe Glu Gln Glu Phe Ser Val Pro Glu  
 450 455 460

Lys Thr Asn Leu Glu Met Val Leu Asn Asp Lys Ala Ile Ser Pro Pro  
 465 470 475 480

Lys Arg Leu Ile Trp Ser Val Tyr Pro Lys Asn Tyr Leu Pro Glu Thr  
 485 490 495

Ile Lys Asn Arg Tyr Leu Glu Glu Thr Phe Asn Ala Ser Asp Ser Leu  
 500 505 510

Lys Thr Arg Arg Val Leu Glu Tyr Tyr Leu Lys Asp Asn Lys Phe Asp  
 515 520 525

Gln Lys Glu Leu Lys Ser Tyr Val Val Arg Gln Glu Tyr Leu Asn Asp  
 530 535 540

Lys Glu His Ile Val Ser Leu Thr Gly Lys Glu Arg Glu Leu Ser Val  
 545 550 555 560

Gly Arg Met Phe Ala Met Gln Pro Gly Lys Gln Arg Gln Ile Gln Ile  
 565 570 575

Leu Ala Glu Lys Leu Leu Ala Asp Asn Ile Val Pro Phe Phe Pro Glu  
 580 585 590

Thr Leu Thr Lys Tyr Gly Asp Leu Asp Leu Gln Arg Ile Met Glu Ile  
 595 600 605

Lys Ser Glu Leu Ser Ser Ile Lys Thr Arg Arg Asn Asp Ser Tyr Asn  
610 615 620

Asn Tyr Ile Ala Arg Ala Ser Ile Val Thr Asp Leu Ser Lys Phe Asn  
625 630 635 640

Gln Ala Phe Arg Tyr Glu Thr Thr Ala Ile Cys Ala Asp Val Ala Asp  
645 650 655

Glu Leu His Gly Thr Gln Ser Leu Phe Cys Trp Leu His Leu Ile Val  
660 665 670

Pro Met Thr Thr Met Ile Cys Ala Tyr Arg His Ala Pro Pro Glu Thr  
675 680 685

Lys Gly Glu Tyr Asp Ile Asp Lys Ile Glu Glu Gln Ser Gly Leu Tyr  
690 695 700

Arg Tyr His Met Gly Gly Ile Glu Gly Trp Cys Gln Lys Leu Trp Thr  
705 710 715 720

Met Glu Ala Ile Ser Leu Leu Asp Val Val Ser Val Lys Thr Arg Cys  
725 730 735

Gln Met Thr Ser Leu Leu Asn Gly Asp Asn Gln Ser Ile Asp Val Ser  
740 745 750

Lys Pro Val Lys Leu Ser Glu Gly Leu Asp Glu Val Lys Ala Asp Tyr  
755 760 765

Arg Leu Ala Val Lys Met Leu Lys Glu Ile Arg Asp Ala Tyr Arg Asn  
770 775 780

Ile Gly His Lys Leu Lys Glu Gly Glu Thr Tyr Ile Ser Arg Asp Leu  
785 790 795 800

Gln Phe Ile Ser Lys Val Ile Gln Ser Glu Gly Val Met His Pro Thr  
805 810 815

Pro Ile Lys Lys Val Leu Arg Val Gly Pro Trp Ile Asn Thr Ile Leu  
820 825 830

Asp Asp Ile Lys Thr Ser Ala Glu Ser Ile Gly Ser Leu Cys Gln Glu  
835 840 845

Leu Glu Phe Arg Gly Glu Ser Ile Ile Val Ser Leu Ile Leu Arg Asn  
850 855 860

Phe Trp Leu Tyr Asn Leu Tyr Met His Glu Ser Lys Gln His Pro Leu  
865 870 875 880

Ala Gly Lys Gln Leu Phe Lys Gln Leu Asn Lys Thr Leu Thr Ser Val  
885 890 895

Gln Arg Phe Phe Glu Ile Lys Arg Glu Asn Glu Val Val Asp Leu Trp  
900 905 910

Met Asn Ile Pro Met Gln Phe Gly Gly Gly Asp Pro Val Val Phe Tyr  
915 920 925

Arg Ser Phe Tyr Arg Arg Thr Pro Asp Phe Leu Thr Glu Ala Ile Ser  
930 935 940

His Val Asp Ile Leu Leu Lys Ile Ser Ala Asn Ile Lys Asn Glu Thr  
945 950 955 960

Lys Val Ser Phe Phe Lys Ala Leu Leu Ser Ile Glu Lys Asn Glu Arg  
965 970 975

Ala Thr Leu Thr Thr Leu Met Arg Asp Pro Gln Ala Val Gly Ser Glu  
980 985 990

Arg Gln Ala Lys Val Thr Ser Asp Ile Asn Arg Thr Ala Val Thr Ser  
995 1000 1005

Ile Leu Ser Leu Ser Pro Asn Gln Leu Phe Ser Asp Ser Ala Ile  
1010 1015 1020

His Tyr Ser Arg Asn Glu Glu Glu Val Gly Ile Ile Ala Glu Asn  
1025 1030 1035

Ile Thr Pro Val Tyr Pro His Gly Leu Arg Val Leu Tyr Glu Ser  
1040 1045 1050

Leu Pro Phe His Lys Ala Glu Lys Val Val Asn Met Ile Ser Gly  
1055 1060 1065

Thr Lys Ser Ile Thr Asn Leu Leu Gln Arg Thr Ser Ala Ile Asn  
1070 1075 1080

Gly Glu Asp Ile Asp Arg Ala Val Ser Met Met Leu Glu Asn Leu  
 1085 1090 1095

Gly Leu Leu Ser Arg Ile Leu Ser Val Val Val Asp Ser Ile Glu  
 1100 1105 1110

Ile Pro Ile Lys Ser Asn Gly Arg Leu Ile Cys Cys Gln Ile Ser  
 1115 1120 1125

Arg Thr Leu Arg Glu Thr Ser Trp Asn Asn Met Glu Ile Val Gly  
 1130 1135 1140

Val Thr Ser Pro Ser Ile Thr Thr Cys Met Asp Val Ile Tyr Ala  
 1145 1150 1155

Thr Ser Ser His Leu Lys Gly Ile Ile Ile Glu Lys Phe Ser Thr  
 1160 1165 1170

Asp Arg Thr Thr Arg Gly Gln Arg Gly Pro Lys Ser Pro Trp Val  
 1175 1180 1185

Gly Ser Ser Thr Gln Glu Lys Lys Leu Val Pro Val Tyr Asn Arg  
 1190 1195 1200

Gln Ile Leu Ser Lys Gln Gln Arg Glu Gln Leu Glu Ala Ile Gly  
 1205 1210 1215

Lys Met Arg Trp Val Tyr Lys Gly Thr Pro Gly Leu Arg Arg Leu  
 1220 1225 1230

Leu Asn Lys Ile Cys Leu Gly Ser Leu Gly Ile Ser Tyr Lys Cys  
 1235 1240 1245

Val Lys Pro Leu Leu Pro Arg Phe Met Ser Val Asn Phe Leu His  
 1250 1255 1260

Arg Leu Ser Val Ser Ser Arg Pro Met Glu Phe Pro Ala Ser Val  
 1265 1270 1275

Pro Ala Tyr Arg Thr Thr Asn Tyr His Phe Asp Thr Ser Pro Ile  
 1280 1285 1290

Asn Gln Ala Leu Ser Glu Arg Phe Gly Asn Glu Asp Ile Asn Leu  
 1295 1300 1305





Glu Gln	Leu Arg Ser Ala Glu	Leu His Glu Ile Pro	Trp Ile Val
1535	1540	1545	
Asn Ala	Glu Gly Asp Leu Val	Glu Ile Lys Ser Ile	Lys Ile Tyr
1550	1555	1560	
Leu Gln	Leu Ile Glu Gln Ser	Leu Phe Leu Arg Ile	Thr Val Leu
1565	1570	1575	
Asn Tyr	Thr Asp Met Ala His	Ala Leu Thr Arg Leu	Ile Arg Lys
1580	1585	1590	
Lys Leu	Met Cys Asp Asn Ala	Leu Leu Thr Pro Ile	Ser Ser Pro
1595	1600	1605	
Met Val	Asn Leu Thr Gln Val	Ile Asp Pro Thr Thr	Gln Leu Asp
1610	1615	1620	
Tyr Phe	Pro Lys Ile Thr Phe	Glu Arg Leu Lys Asn	Tyr Asp Thr
1625	1630	1635	
Ser Ser	Asn Tyr Ala Lys Gly	Lys Leu Thr Arg Asn	Tyr Met Ile
1640	1645	1650	
Leu Leu	Pro Trp Gln His Val	Asn Arg Tyr Asn Phe	Val Phe Ser
1655	1660	1665	
Ser Thr	Gly Cys Lys Val Ser	Leu Lys Thr Cys Ile	Gly Lys Leu
1670	1675	1680	
Met Lys	Asp Leu Asn Pro Lys	Val Leu Tyr Phe Ile	Gly Glu Gly
1685	1690	1695	
Ala Gly	Asn Trp Met Ala Arg	Thr Ala Cys Glu Tyr	Pro Asp Ile
1700	1705	1710	
Lys Phe	Val Tyr Arg Ser Leu	Lys Asp Asp Leu Asp	His His Tyr
1715	1720	1725	
Pro Leu	Glu Tyr Gln Arg Val	Ile Gly Glu Leu Ser	Arg Ile Ile
1730	1735	1740	
Asp Ser	Gly Glu Gly Leu Ser	Met Glu Thr Thr Asp	Ala Thr Gln
1745	1750	1755	

Lys Thr	His Trp Asp Leu Ile	His Arg Val Ser Lys	Asp Ala Leu
1760	1765	1770	
Leu Ile	Thr Leu Cys Asp Ala	Glu Phe Lys Asp Arg	Asp Asp Phe
1775	1780	1785	
Phe Lys	Met Val Ile Leu Trp	Arg Lys His Val Leu	Ser Cys Arg
1790	1795	1800	
Ile Cys	Thr Thr Tyr Gly Thr	Asp Leu Tyr Leu Phe	Ala Lys Tyr
1805	1810	1815	
His Ala	Lys Asp Cys Asn Val	Lys Leu Pro Phe Phe	Val Arg Ser
1820	1825	1830	
Val Ala	Thr Phe Ile Met Gln	Gly Ser Lys Leu Ser	Gly Ser Glu
1835	1840	1845	
Cys Tyr	Ile Leu Leu Thr Leu	Gly His His Asn Ser	Leu Pro Cys
1850	1855	1860	
His Gly	Glu Ile Gln Asn Ser	Lys Met Lys Ile Ala	Val Cys Asn
1865	1870	1875	
Asp Phe	Tyr Ala Ala Lys Lys	Leu Asp Asn Lys Ser	Ile Glu Ala
1880	1885	1890	
Asn Cys	Lys Ser Leu Leu Ser	Gly Leu Arg Ile Pro	Ile Asn Lys
1895	1900	1905	
Lys Glu	Leu Asp Arg Gln Arg	Arg Leu Leu Thr Leu	Gln Ser Asn
1910	1915	1920	
His Ser	Ser Val Ala Thr Val	Gly Gly Ser Lys Ile	Ile Glu Ser
1925	1930	1935	
Lys Trp	Leu Thr Asn Lys Ala	Ser Thr Ile Ile Asp	Trp Leu Glu
1940	1945	1950	
His Ile	Leu Asn Ser Pro Lys	Gly Glu Leu Asn Tyr	Asp Phe Phe
1955	1960	1965	
Glu Ala	Leu Glu Asn Thr Tyr	Pro Asn Met Ile Lys	Leu Ile Asp
1970	1975	1980	

Asn Leu Gly Asn Ala Glu Ile Lys Lys Leu Ile Lys Val Thr Gly  
 1985 1990 1995

Tyr Met Leu Val Ser Lys Lys  
 2000 2005

<210> 8  
 <211> 177  
 <212> PRT  
 <213> human metapneumovirus

<400> 8

Met Lys Thr Leu Asp Val Ile Lys Ser Asp Gly Ser Ser Glu Thr Cys  
 1 5 10 15

Asn Gln Leu Lys Lys Ile Ile Lys Lys His Ser Gly Lys Leu Leu Ile  
 20 25 30

Ala Ser Lys Pro Thr Leu Ala Leu Leu Thr Ser Phe Thr Val Thr Ile  
 35 40 45

Thr Val Asn Tyr Thr Lys Val Glu Asn Asn Leu Gln Ala Cys Gln Leu  
 50 55 60

Lys Asn Glu Ser Asp Lys Lys Asp Thr Lys Leu Asn Thr Thr Ser Thr  
 65 70 75 80

Thr Ile Arg Pro Ile Pro Asp Leu Asn Ala Val Gln Tyr Leu Lys Arg  
 85 90 95

Leu Ile Gln Lys His Thr Asn Ser Val Thr Lys Asp Arg Asp Thr Cys  
 100 105 110

Trp Arg Ile His Thr Asn Gln Cys Thr Asn Ile Lys Ile Tyr Lys Phe  
 115 120 125

Leu Cys Phe Gly Ser Met Asn Ser Thr Asn Thr Asp Cys Glu Glu Pro  
 130 135 140

Thr Val Leu Cys Asp Lys Lys Ser Lys Thr Met Thr Glu Lys His Arg  
 145 150 155 160

Lys Ala Glu Cys His Arg Pro His Thr Thr Glu Trp Trp Cys His Tyr  
 165 170 175

Leu

<210> 9  
<211> 236  
<212> PRT  
<213> human metapneumovirus

<400> 9

Met Glu Ala Arg Val Glu Asn Ile Arg Ala Ile Asp Met Phe Lys Ala  
1 5 10 15

Lys Met Lys Asn Arg Ile Arg Ser Ser Lys Cys His Arg Asn Ala Thr  
20 25 30

Leu Ile Leu Ile Gly Ser Thr Ala Pro Ser Met Ala Leu Asn Thr Leu  
35 40 45

Leu Ile Ile Asp His Ala Thr Ser Lys Asn Met Thr Lys Val Glu His  
50 55 60

Cys Val Asn Met Pro Pro Val Glu Pro Ser Lys Lys Thr Pro Met Thr  
65 70 75 80

Ser Ala Ala Asp Pro Asn Thr Lys Pro Asn Pro Gln Gln Ala Thr Gln  
85 90 95

Leu Thr Thr Glu Asp Ser Thr Ser Leu Ala Ala Thr Leu Glu Asp His  
100 105 110

Leu His Thr Gly Thr Thr Pro Thr Pro Asp Ala Thr Val Ser Gln Gln  
115 120 125

Thr Thr Asp Glu His Thr Thr Leu Leu Arg Ser Thr Asn Arg Gln Thr  
130 135 140

Thr Gln Thr Thr Ala Glu Lys Lys Pro Thr Arg Ala Thr Thr Lys Lys  
145 150 155 160

Glu Thr Thr Thr Arg Thr Thr Ser Thr Ala Ala Thr Gln Thr Leu Asn  
165 170 175

Thr Thr Asn Gln Thr Ser Asn Gly Arg Glu Ala Thr Thr Thr Ser Ala  
180 185 190

Arg Ser Arg Asn Asn Ala Thr Thr Gln Ser Ser Asp Gln Thr Thr Gln

Ala Ala Asp Pro Ser Ser Gln Ser Gln His Thr Gln Lys Ser Thr Thr  
 210 215 220

Thr Thr His Asn Thr Asp Thr Ser Ser Pro Ser Ser  
 225 230 235

<210> 10  
 <211> 183  
 <212> PRT  
 <213> human metapneumovirus

<400> 10

Met Ile Thr Leu Asp Val Ile Lys Ser Asp Gly Ser Ser Lys Thr Cys  
 1 5 10 15

Thr His Leu Lys Lys Ile Ile Lys Asp His Ser Gly Lys Val Leu Ile  
 20 25 30

Val Leu Lys Leu Ile Leu Ala Leu Leu Thr Phe Leu Thr Val Thr Ile  
 35 40 45

Thr Ile Asn Tyr Ile Lys Val Glu Asn Asn Leu Gln Ile Cys Gln Ser  
 50 55 60

Lys Thr Glu Ser Asp Lys Lys Asp Ser Ser Ser Asn Thr Thr Ser Val  
 65 70 75 80

Thr Thr Lys Thr Thr Leu Asn His Asp Ile Thr Gln Tyr Phe Lys Ser  
 85 90 95

Leu Ile Gln Arg Tyr Thr Asn Ser Ala Ile Asn Ser Asp Thr Cys Trp  
 100 105 110

Lys Ile Asn Arg Asn Gln Cys Thr Asn Ile Thr Thr Tyr Lys Phe Leu  
 115 120 125

Cys Phe Lys Ser Glu Asp Thr Lys Thr Asn Asn Cys Asp Lys Leu Thr  
 130 135 140

Asp Leu Cys Arg Asn Lys Pro Lys Pro Ala Val Gly Val Tyr His Ile  
 145 150 155 160

Val Glu Cys His Cys Ile Tyr Thr Val Lys Trp Lys Cys Tyr His Tyr  
 165 170 175

Pro Thr Asp Glu Thr Gln Ser  
180

<210> 11  
<211> 236  
<212> PRT  
<213> human metapneumovirus

<400> 11

Met Glu Val Lys Val Glu Asn Ile Arg Thr Ile Asp Met Leu Lys Ala  
1 5 10 15

Arg Val Lys Asn Arg Val Ala Arg Ser Lys Cys Phe Lys Asn Ala Ser  
20 25 30

Leu Val Leu Ile Gly Ile Thr Thr Leu Ser Ile Ala Leu Asn Ile Tyr  
35 40 45

Leu Ile Ile Asn Tyr Lys Met Gln Lys Asn Thr Ser Glu Ser Glu His  
50 55 60

His Thr Ser Ser Ser Pro Met Glu Ser Ser Arg Glu Thr Pro Thr Val  
65 70 75 80

Pro Thr Asp Asn Ser Asp Thr Asn Ser Ser Pro Gln His Pro Thr Gln  
85 90 95

Gln Ser Thr Glu Gly Ser Thr Leu Tyr Phe Ala Ala Ser Ala Ser Ser  
100 105 110

Pro Glu Thr Glu Pro Thr Ser Thr Pro Asp Thr Thr Asn Arg Pro Pro  
115 120 125

Phe Val Asp Thr His Thr Thr Pro Pro Ser Ala Ser Arg Thr Lys Thr  
130 135 140

Ser Pro Ala Val His Thr Lys Asn Asn Pro Arg Thr Ser Ser Arg Thr  
145 150 155 160

His Ser Pro Pro Arg Ala Thr Thr Arg Thr Ala Arg Arg Thr Thr Thr  
165 170 175

Leu Arg Thr Ser Ser Thr Arg Lys Arg Pro Ser Thr Ala Ser Val Gln  
180 185 190

Pro Asp Ile Ser Ala Thr Thr His Lys Asn Glu Glu Ala Ser Pro Ala  
 195 200 205

Ser Pro Gln Thr Ser Ala Ser Thr Thr Arg Ile Gln Arg Lys Ser Val  
 210 215 220

Glu Ala Asn Thr Ser Thr Thr Tyr Asn Gln Thr Ser  
 225 230 235

<210> 12  
 <211> 2005  
 <212> PRT  
 <213> human metapneumovirus

<400> 12

Met Asp Pro Leu Asn Glu Ser Thr Val Asn Val Tyr Leu Pro Asp Ser  
 1 5 10 15

Tyr Leu Lys Gly Val Ile Ser Phe Ser Glu Thr Asn Ala Ile Gly Ser  
 20 25 30

Cys Leu Leu Lys Arg Pro Tyr Leu Lys Asn Asp Asn Thr Ala Lys Val  
 35 40 45

Ala Ile Glu Asn Pro Val Ile Glu His Val Arg Leu Lys Asn Ala Val  
 50 55 60

Asn Ser Lys Met Lys Ile Ser Asp Tyr Lys Ile Val Glu Pro Val Asn  
 65 70 75 80

Met Gln His Glu Ile Met Lys Asn Val His Ser Cys Glu Leu Thr Leu  
 85 90 95

Leu Lys Gln Phe Leu Thr Arg Ser Lys Asn Ile Ser Thr Leu Lys Leu  
 100 105 110

Asn Met Ile Cys Asp Trp Leu Gln Leu Lys Ser Thr Ser Asp Asp Thr  
 115 120 125

Ser Ile Leu Ser Phe Ile Asp Val Glu Phe Ile Pro Ser Trp Val Ser  
 130 135 140

Asn Trp Phe Ser Asn Trp Tyr Asn Leu Asn Lys Leu Ile Leu Glu Phe  
 145 150 155 160



Arg Lys Glu Glu Val Ile Arg Thr Gly Ser Ile Leu Cys Arg Ser Leu  
165 170 175

Gly Lys Leu Val Phe Val Val Ser Ser Tyr Gly Cys Ile Val Lys Ser  
180 185 190

Asn Lys Ser Lys Arg Val Ser Phe Phe Thr Tyr Asn Gln Leu Leu Thr  
195 200 205

Trp Lys Asp Val Met Leu Ser Arg Phe Asn Ala Asn Phe Cys Ile Trp  
210 215 220

Val Ser Asn Ser Leu Asn Glu Asn Gln Glu Gly Leu Gly Leu Arg Ser  
225 230 235 240

Asn Leu Gln Gly Ile Leu Thr Asn Lys Leu Tyr Glu Thr Val Asp Tyr  
245 250 255

Met Leu Ser Leu Cys Cys Asn Glu Gly Phe Ser Leu Val Lys Glu Phe  
260 265 270

Glu Gly Phe Ile Met Ser Glu Ile Leu Arg Ile Thr Glu His Ala Gln  
275 280 285

Phe Ser Thr Arg Phe Arg Asn Thr Leu Leu Asn Gly Leu Thr Asp Gln  
290 295 300

Leu Thr Lys Leu Lys Asn Lys Asn Arg Leu Arg Val His Gly Thr Val  
305 310 315 320

Leu Glu Asn Asn Asp Tyr Pro Met Tyr Glu Val Val Leu Lys Leu Leu  
325 330 335

Gly Asp Thr Leu Arg Cys Ile Lys Leu Leu Ile Asn Lys Asn Leu Glu  
340 345 350

Asn Ala Ala Glu Leu Tyr Tyr Ile Phe Arg Ile Phe Gly His Pro Met  
355 360 365

Val Asp Glu Arg Asp Ala Met Asp Ala Val Lys Leu Asn Asn Glu Ile  
370 375 380

Thr Lys Ile Leu Arg Trp Glu Ser Leu Thr Glu Leu Arg Gly Ala Phe  
385 390 395 400

Ile Leu Arg Ile Ile Lys Gly Phe Val Asp Asn Asn Lys Arg Trp Pro  
 405 410 415  
 Lys Ile Lys Asn Leu Lys Val Leu Ser Lys Arg Trp Thr Met Tyr Phe  
 420 425 430  
 Lys Ala Lys Ser Tyr Pro Ser Gln Leu Glu Leu Ser Glu Gln Asp Phe  
 435 440 445  
 Leu Glu Leu Ala Ala Ile Gln Phe Glu Gln Glu Phe Ser Val Pro Glu  
 450 455 460  
 Lys Thr Asn Leu Glu Met Val Leu Asn Asp Lys Ala Ile Ser Pro Pro  
 465 470 475 480  
 Lys Arg Leu Ile Trp Ser Val Tyr Pro Lys Asn Tyr Leu Pro Glu Lys  
 485 490 495  
 Ile Lys Asn Arg Tyr Leu Glu Glu Thr Phe Asn Ala Ser Asp Ser Leu  
 500 505 510  
 Lys Thr Arg Arg Val Leu Glu Tyr Tyr Leu Lys Asp Asn Lys Phe Asp  
 515 520 525  
 Gln Lys Glu Leu Lys Ser Tyr Val Val Lys Gln Glu Tyr Leu Asn Asp  
 530 535 540  
 Lys Asp His Ile Val Ser Leu Thr Gly Lys Glu Arg Glu Leu Ser Val  
 545 550 555 560  
 Gly Arg Met Phe Ala Met Gln Pro Gly Lys Gln Arg Gln Ile Gln Ile  
 565 570 575  
 Leu Ala Glu Lys Leu Leu Ala Asp Asn Ile Val Pro Phe Phe Pro Glu  
 580 585 590  
 Thr Leu Thr Lys Tyr Gly Asp Leu Asp Leu Gln Arg Ile Met Glu Ile  
 595 600 605  
 Lys Ser Glu Leu Ser Ser Ile Lys Thr Arg Arg Asn Asp Ser Tyr Asn  
 610 615 620  
 Asn Tyr Ile Ala Arg Ala Ser Ile Val Thr Asp Leu Ser Lys Phe Asn  
 625 630 635 640

Gln Ala Phe Arg Tyr Glu Thr Thr Ala Ile Cys Ala Asp Val Ala Asp  
645 650 655

Glu Leu His Gly Thr Gln Ser Leu Phe Cys Trp Leu His Leu Ile Val  
660 665 670

Pro Met Thr Thr Met Ile Cys Ala Tyr Arg His Ala Pro Pro Glu Thr  
675 680 685

Lys Gly Glu Tyr Asp Ile Asp Lys Ile Glu Glu Gln Ser Gly Leu Tyr  
690 695 700

Arg Tyr His Met Gly Gly Ile Glu Gly Trp Cys Gln Lys Leu Trp Thr  
705 710 715 720

Met Glu Ala Ile Ser Leu Leu Asp Val Val Ser Val Lys Thr Arg Cys  
725 730 735

Gln Met Thr Ser Leu Leu Asn Gly Asp Asn Gln Ser Ile Asp Val Ser  
740 745 750

Lys Pro Val Lys Leu Ser Glu Gly Leu Asp Glu Val Lys Ala Asp Tyr  
755 760 765

Ser Leu Ala Val Lys Met Leu Lys Glu Ile Arg Asp Ala Tyr Arg Asn  
770 775 780

Ile Gly His Lys Leu Lys Glu Gly Glu Thr Tyr Ile Ser Arg Asp Leu  
785 790 795 800

Gln Phe Ile Ser Lys Val Ile Gln Ser Glu Gly Val Met His Pro Thr  
805 810 815

Pro Ile Lys Lys Ile Leu Arg Val Gly Pro Trp Ile Asn Thr Ile Leu  
820 825 830

Asp Asp Ile Lys Thr Ser Ala Glu Ser Ile Gly Ser Leu Cys Gln Glu  
835 840 845

Leu Glu Phe Arg Gly Glu Ser Ile Ile Val Ser Leu Ile Leu Arg Asn  
850 855 860

Phe Trp Leu Tyr Asn Leu Tyr Met His Glu Ser Lys Gln His Pro Leu  
865 870 875 880

Ala Gly Lys Gln Leu Phe Lys Gln Leu Asn Lys Thr Leu Thr Ser Val  
885 890 895

Gln Arg Phe Phe Glu Ile Lys Lys Glu Asn Glu Val Val Asp Leu Trp  
900 905 910

Met Asn Ile Pro Met Gln Phe Gly Gly Gly Asp Pro Val Val Phe Tyr  
915 920 925

Arg Ser Phe Tyr Arg Arg Thr Pro Asp Phe Leu Thr Glu Ala Ile Ser  
930 935 940

His Val Asp Ile Leu Leu Arg Ile Ser Ala Asn Ile Arg Asn Glu Ala  
945 950 955 960

Lys Ile Ser Phe Phe Lys Ala Leu Leu Ser Ile Glu Lys Asn Glu Arg  
965 970 975

Ala Thr Leu Thr Thr Leu Met Arg Asp Pro Gln Ala Val Gly Ser Glu  
980 985 990

Arg Gln Ala Lys Val Thr Ser Asp Ile Asn Arg Thr Ala Val Thr Ser  
995 1000 1005

Ile Leu Ser Leu Ser Pro Asn Gln Leu Phe Ser Asp Ser Ala Ile  
1010 1015 1020

His Tyr Ser Arg Asn Glu Glu Glu Val Gly Ile Ile Ala Asp Asn  
1025 1030 1035

Ile Thr Pro Val Tyr Pro His Gly Leu Arg Val Leu Tyr Glu Ser  
1040 1045 1050

Leu Pro Phe His Lys Ala Glu Lys Val Val Asn Met Ile Ser Gly  
1055 1060 1065

Thr Lys Ser Ile Thr Asn Leu Leu Gln Arg Thr Ser Ala Ile Asn  
1070 1075 1080

Gly Glu Asp Ile Asp Arg Ala Val Ser Met Met Leu Glu Asn Leu  
1085 1090 1095

Gly Leu Leu Ser Arg Ile Leu Ser Val Val Val Asp Ser Ile Glu  
1100 1105 1110

Ile Pro Thr Lys Ser Asn Gly	Arg Leu Ile Cys Cys	Gln Ile Ser
1115	1120	1125
Arg Thr Leu Arg Glu Thr Ser	Trp Asn Asn Met Glu	Ile Val Gly
1130	1135	1140
Val Thr Ser Pro Ser Ile Thr	Thr Cys Met Asp Val	Ile Tyr Ala
1145	1150	1155
Thr Ser Ser His Leu Lys Gly	Ile Ile Ile Glu Lys	Phe Ser Thr
1160	1165	1170
Asp Arg Thr Thr Arg Gly Gln	Arg Gly Pro Lys Ser	Pro Trp Val
1175	1180	1185
Gly Ser Ser Thr Gln Glu Lys	Lys Leu Val Pro Val	Tyr Asn Arg
1190	1195	1200
Gln Ile Leu Ser Lys Gln Gln	Arg Glu Gln Leu Glu	Ala Ile Gly
1205	1210	1215
Lys Met Arg Trp Val Tyr Lys	Gly Thr Pro Gly Leu	Arg Arg Leu
1220	1225	1230
Leu Asn Lys Ile Cys Leu Gly	Ser Leu Gly Ile Ser	Tyr Lys Cys
1235	1240	1245
Val Lys Pro Leu Leu Pro Arg	Phe Met Ser Val Asn	Phe Leu His
1250	1255	1260
Arg Leu Ser Val Ser Ser Arg	Pro Met Glu Phe Pro	Ala Ser Val
1265	1270	1275
Pro Ala Tyr Arg Thr Thr Asn	Tyr His Phe Asp Thr	Ser Pro Ile
1280	1285	1290
Asn Gln Ala Leu Ser Glu Arg	Phe Gly Asn Glu Asp	Ile Asn Leu
1295	1300	1305
Val Phe Gln Asn Ala Ile Ser	Cys Gly Ile Ser Ile	Met Ser Val
1310	1315	1320
Val Glu Gln Leu Thr Gly Arg	Ser Pro Lys Gln Leu	Val Leu Ile
1325	1330	1335

Pro Gln Leu Glu Glu Ile Asp Ile Met Pro Pro Pro Val Phe Gln  
 1340 1345 1350

Gly Lys Phe Asn Tyr Lys Leu Val Asp Lys Ile Thr Ser Asp Gln  
 1355 1360 1365

His Ile Phe Ser Pro Asp Lys Ile Asp Met Leu Thr Leu Gly Lys  
 1370 1375 1380

Met Leu Met Pro Thr Ile Lys Gly Gln Lys Thr Asp Gln Phe Leu  
 1385 1390 1395

Asn Lys Arg Glu Asn Tyr Phe His Gly Asn Asn Leu Ile Glu Ser  
 1400 1405 1410

Leu Ser Ala Ala Leu Ala Cys His Trp Cys Gly Ile Leu Thr Glu  
 1415 1420 1425

Gln Cys Ile Glu Asn Asn Ile Phe Lys Lys Asp Trp Gly Asp Gly  
 1430 1435 1440

Phe Ile Ser Asp His Ala Phe Met Asp Phe Lys Ile Phe Leu Cys  
 1445 1450 1455

Val Phe Lys Thr Lys Leu Leu Cys Ser Trp Gly Ser Gln Gly Lys  
 1460 1465 1470

Asn Ile Lys Asp Glu Asp Ile Val Asp Glu Ser Ile Asp Lys Leu  
 1475 1480 1485

Leu Arg Ile Asp Asn Thr Phe Trp Arg Met Phe Ser Lys Val Met  
 1490 1495 1500

Phe Glu Ser Lys Val Lys Lys Arg Ile Met Leu Tyr Asp Val Lys  
 1505 1510 1515

Phe Leu Ser Leu Val Gly Tyr Ile Gly Phe Lys Asn Trp Phe Ile  
 1520 1525 1530

Glu Gln Leu Arg Ser Ala Glu Leu His Glu Val Pro Trp Ile Val  
 1535 1540 1545

Asn Ala Glu Gly Asp Leu Val Glu Ile Lys Ser Ile Lys Ile Tyr  
 1550 1555 1560

Leu Gln Leu Ile Glu Gln Ser Leu Phe Leu Arg Ile Thr Val Leu  
 1565 1570 1575

Asn Tyr Thr Asp Met Ala His Ala Leu Thr Arg Leu Ile Arg Lys  
 1580 1585 1590

Lys Leu Met Cys Asp Asn Ala Leu Leu Thr Pro Ile Pro Ser Pro  
 1595 1600 1605

Met Val Asn Leu Thr Gln Val Ile Asp Pro Thr Glu Gln Leu Ala  
 1610 1615 1620

Tyr Phe Pro Lys Ile Thr Phe Glu Arg Leu Lys Asn Tyr Asp Thr  
 1625 1630 1635

Ser Ser Asn Tyr Ala Lys Gly Lys Leu Thr Arg Asn Tyr Met Ile  
 1640 1645 1650

Leu Leu Pro Trp Gln His Val Asn Arg Tyr Asn Phe Val Phe Ser  
 1655 1660 1665

Ser Thr Gly Cys Lys Val Ser Leu Lys Thr Cys Ile Gly Lys Leu  
 1670 1675 1680

Met Lys Asp Leu Asn Pro Lys Val Leu Tyr Phe Ile Gly Glu Gly  
 1685 1690 1695

Ala Gly Asn Trp Met Ala Arg Thr Ala Cys Glu Tyr Pro Asp Ile  
 1700 1705 1710

Lys Phe Val Tyr Arg Ser Leu Lys Asp Asp Leu Asp His His Tyr  
 1715 1720 1725

Pro Leu Glu Tyr Gln Arg Val Ile Gly Glu Leu Ser Arg Ile Ile  
 1730 1735 1740

Asp Ser Gly Glu Gly Leu Ser Met Glu Thr Thr Asp Ala Thr Gln  
 1745 1750 1755

Lys Thr His Trp Asp Leu Ile His Arg Val Ser Lys Asp Ala Leu  
 1760 1765 1770

Leu Ile Thr Leu Cys Asp Ala Glu Phe Lys Asp Arg Asp Asp Phe  
 1775 1780 1785

Phe	Lys	Met	Val	Ile	Leu	Trp	Arg	Lys	His	Val	Leu	Ser	Cys	Arg
1790						1795						1800		
Ile	Cys	Thr	Thr	Tyr	Gly	Thr	Asp	Leu	Tyr	Leu	Phe	Ala	Lys	Tyr
1805						1810					1815			
His	Ala	Lys	Asp	Cys	Asn	Val	Lys	Leu	Pro	Phe	Phe	Val	Arg	Ser
1820						1825					1830			
Val	Ala	Thr	Phe	Ile	Met	Gln	Gly	Ser	Lys	Leu	Ser	Gly	Ser	Glu
1835						1840					1845			
Cys	Tyr	Ile	Leu	Leu	Thr	Leu	Gly	His	His	Asn	Asn	Leu	Pro	Cys
1850						1855					1860			
His	Gly	Glu	Ile	Gln	Asn	Ser	Lys	Met	Lys	Ile	Ala	Val	Cys	Asn
1865						1870					1875			
Asp	Phe	Tyr	Ala	Ala	Lys	Lys	Leu	Asp	Asn	Lys	Ser	Ile	Glu	Ala
1880						1885					1890			
Asn	Cys	Lys	Ser	Leu	Leu	Ser	Gly	Leu	Arg	Ile	Pro	Ile	Asn	Lys
1895						1900					1905			
Lys	Glu	Leu	Asn	Arg	Gln	Arg	Arg	Leu	Leu	Thr	Leu	Gln	Ser	Asn
1910						1915					1920			
His	Ser	Ser	Val	Ala	Thr	Val	Gly	Gly	Ser	Lys	Val	Ile	Glu	Ser
1925						1930					1935			
Lys	Trp	Leu	Thr	Asn	Lys	Ala	Asn	Thr	Ile	Ile	Asp	Trp	Leu	Glu
1940						1945					1950			
His	Ile	Leu	Asn	Ser	Pro	Lys	Gly	Glu	Leu	Asn	Tyr	Asp	Phe	Phe
1955						1960					1965			
Glu	Ala	Leu	Glu	Asn	Thr	Tyr	Pro	Asn	Met	Ile	Lys	Leu	Ile	Asp
1970						1975					1980			
Asn	Leu	Gly	Asn	Ala	Glu	Ile	Lys	Lys	Leu	Ile	Lys	Val	Thr	Gly
1985						1990					1995			
Tyr	Met	Leu	Val	Ser	Lys	Lys								
2000						2005								



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 <211> 2165  
 <212> PRT  
 <213> human respiratory syncytial virus strain A2

<400> 13

Met Asp Pro Ile Ile Asn Gly Asn Ser Ala Asn Val Tyr Leu Thr Asp  
 1 5 10 15

Ser Tyr Leu Lys Gly Val Ile Ser Phe Ser Glu Cys Asn Ala Leu Gly  
 20 25 30

Ser Tyr Ile Phe Asn Gly Pro Tyr Leu Lys Asn Asp Tyr Thr Asn Leu  
 35 40 45

Ile Ser Arg Gln Asn Pro Leu Ile Glu His Met Asn Leu Lys Lys Leu  
 50 55 60

Asn Ile Thr Gln Ser Leu Ile Ser Lys Tyr His Lys Gly Glu Ile Lys  
 65 70 75 80

Leu Glu Glu Pro Thr Tyr Phe Gln Ser Leu Leu Met Thr Tyr Lys Ser  
 85 90 95

Met Thr Ser Ser Glu Gln Ile Ala Thr Thr Asn Leu Leu Lys Lys Ile  
 100 105 110

Ile Arg Arg Ala Ile Glu Ile Ser Asp Val Lys Val Tyr Ala Ile Leu  
 115 120 125

Asn Lys Leu Gly Leu Lys Glu Lys Asp Lys Ile Lys Ser Asn Asn Gly  
 130 135 140

Gln Asp Glu Asp Asn Ser Val Ile Thr Thr Ile Ile Lys Asp Asp Ile  
 145 150 155 160

Leu Ser Ala Val Lys Asp Asn Gln Ser His Leu Lys Ala Asp Lys Asn  
 165 170 175

His Ser Thr Lys Gln Lys Asp Thr Ile Lys Thr Thr Leu Leu Lys Lys  
 180 185 190

Leu Met Cys Ser Met Gln His Pro Pro Ser Trp Leu Ile His Trp Phe  
 195 200 205

Asn Leu Tyr Thr Lys Leu Asn Asn Ile Leu Thr Gln Tyr Arg Ser Asn

210

215

220

Glu Val Lys Asn His Gly Phe Thr Leu Ile Asp Asn Gln Thr Leu Ser  
 225 230 235 240

Gly Phe Gln Phe Ile Leu Asn Gln Tyr Gly Cys Ile Val Tyr His Lys  
 245 250 255

Glu Leu Lys Arg Ile Thr Val Thr Thr Tyr Asn Gln Phe Leu Thr Trp  
 260 265 270

Lys Asp Ile Ser Leu Ser Arg Leu Asn Val Cys Leu Ile Thr Trp Ile  
 275 280 285

Ser Asn Cys Leu Asn Thr Leu Asn Lys Ser Leu Gly Leu Arg Cys Gly  
 290 295 300

Phe Asn Asn Val Ile Leu Thr Gln Leu Phe Leu Tyr Gly Asp Cys Ile  
 305 310 315 320

Leu Lys Leu Phe His Asn Glu Gly Phe Tyr Ile Ile Lys Glu Val Glu  
 325 330 335

Gly Phe Ile Met Ser Leu Ile Leu Asn Ile Thr Glu Glu Asp Gln Phe  
 340 345 350

Arg Lys Arg Phe Tyr Asn Ser Met Leu Asn Asn Ile Thr Asp Ala Ala  
 355 360 365

Asn Lys Ala Gln Lys Asn Leu Leu Ser Arg Val Cys His Thr Leu Leu  
 370 375 380

Asp Lys Thr Val Ser Asp Asn Ile Ile Asn Gly Arg Trp Ile Ile Leu  
 385 390 395 400

Leu Ser Lys Phe Leu Lys Leu Ile Lys Leu Ala Gly Asp Asn Asn Leu  
 405 410 415

Asn Asn Leu Ser Glu Leu Tyr Phe Leu Phe Arg Ile Phe Gly His Pro  
 420 425 430

Met Val Asp Glu Arg Gln Ala Met Asp Ala Val Lys Ile Asn Cys Asn  
 435 440 445

Glu Thr Lys Phe Tyr Leu Leu Ser Ser Leu Ser Met Leu Arg Gly Ala

450

455

460

Phe Ile Tyr Arg Ile Ile Lys Gly Phe Val Asn Asn Tyr Asn Arg Trp  
 465 470 475 480

Pro Thr Leu Arg Asn Ala Ile Val Leu Pro Leu Arg Trp Leu Thr Tyr  
 485 490 495

Tyr Lys Leu Asn Thr Tyr Pro Ser Leu Leu Glu Leu Thr Glu Arg Asp  
 500 505 510

Leu Ile Val Leu Ser Gly Leu Arg Phe Tyr Arg Glu Phe Arg Leu Pro  
 515 520 525

Lys Lys Val Asp Leu Glu Met Ile Ile Asn Asp Lys Ala Ile Ser Pro  
 530 535 540

Pro Lys Asn Leu Ile Trp Thr Ser Phe Pro Arg Asn Tyr Met Pro Ser  
 545 550 555 560

His Ile Gln Asn Tyr Ile Glu His Glu Lys Leu Lys Phe Ser Glu Ser  
 565 570 575

Asp Lys Ser Arg Arg Val Leu Glu Tyr Tyr Leu Arg Asp Asn Lys Phe  
 580 585 590

Asn Glu Cys Asp Leu Tyr Asn Cys Val Val Asn Gln Ser Tyr Leu Asn  
 595 600 605

Asn Pro Asn His Val Val Ser Leu Thr Gly Lys Glu Arg Glu Leu Ser  
 610 615 620

Val Gly Arg Met Phe Ala Met Gln Pro Gly Met Phe Arg Gln Val Gln  
 625 630 635 640

Ile Leu Ala Glu Lys Met Ile Ala Glu Asn Ile Leu Gln Phe Phe Pro  
 645 650 655

Glu Ser Leu Thr Arg Tyr Gly Asp Leu Glu Leu Gln Lys Ile Leu Glu  
 660 665 670

Leu Lys Ala Gly Ile Ser Asn Lys Ser Asn Arg Tyr Asn Asp Asn Tyr  
 675 680 685

Asn Asn Tyr Ile Ser Lys Cys Ser Ile Ile Thr Asp Leu Ser Lys Phe

690

695

700

Asn Gln Ala Phe Arg Tyr Glu Thr Ser Cys Ile Cys Ser Asp Val Leu  
705 710 715 720

Asp Glu Leu His Gly Val Gln Ser Leu Phe Ser Trp Leu His Leu Thr  
725 730 735

Ile Pro His Val Thr Ile Ile Cys Thr Tyr Arg His Ala Pro Pro Tyr  
740 745 750

Ile Gly Asp His Ile Val Asp Leu Asn Asn Val Asp Glu Gln Ser Gly  
755 760 765

Leu Tyr Arg Tyr His Met Gly Gly Ile Glu Gly Trp Cys Gln Lys Leu  
770 775 780

Trp Thr Ile Glu Ala Ile Ser Leu Leu Asp Leu Ile Ser Leu Lys Gly  
785 790 795 800

Lys Phe Ser Ile Thr Ala Leu Ile Asn Gly Asp Asn Gln Ser Ile Asp  
805 810 815

Ile Ser Lys pro Ile Arg Leu Met Glu Gly Gln Thr His Ala Gln Ala  
820 825 830

Asp Tyr Leu Leu Ala Leu Asn Ser Leu Lys Leu Leu Tyr Lys Glu Tyr  
835 840 845

Ala Gly Ile Gly His Lys Leu Lys Gly Thr Glu Thr Tyr Ile Ser Arg  
850 855 860

Asp Met Gln Phe Met Ser Lys Thr Ile Gln His Asn Gly Val Tyr Tyr  
865 870 875 880

pro Ala Ser Ile Lys Lys Val Leu Arg Val Gly Pro Trp Ile Asn Thr  
885 890 895

Ile Leu Asp Asp Phe Lys Val Ser Leu Glu Ser Ile Gly Ser Leu Thr  
900 905 910

Gln Glu Leu Glu Tyr Arg Gly Glu Ser Leu Leu Cys Ser Leu Ile Phe  
915 920 925

Arg Asn Val Trp Leu Tyr Asn Gln Ile Ala Leu Gln Leu Lys Asn His

Ala Leu Cys Asn Asn Lys Leu Tyr Leu Asp Ile Leu Lys Val Leu Lys  
945 950 955 960

His Leu Lys Thr Phe Phe Asn Leu Asp Asn Ile Asp Thr Ala Leu Thr  
965 970 975

Leu Tyr Met Asn Leu Pro Met Leu Phe Gly Gly Gly Asp Pro Asn Leu  
980 985 990

Leu Tyr Arg Ser Phe Tyr Arg Arg Thr Pro Asp Phe Leu Thr Glu Ala  
995 1000 1005

Ile Val His Ser Val Phe Ile Leu Ser Tyr Tyr Thr Asn His Asp  
1010 1015 1020

Leu Lys Asp Lys Leu Gln Asp Leu Ser Asp Asp Arg Leu Asn Lys  
1025 1030 1035

Phe Leu Thr Cys Ile Ile Thr Phe Asp Lys Asn Pro Asn Ala Glu  
1040 1045 1050

Phe Val Thr Leu Met Arg Asp Pro Gln Ala Leu Gly Ser Glu Arg  
1055 1060 1065

Gln Ala Lys Ile Thr Ser Glu Ile Asn Arg Leu Ala Val Thr Glu  
1070 1075 1080

Val Leu Ser Thr Ala Pro Asn Lys Ile Phe Ser Lys Ser Ala Gln  
1085 1090 1095

His Tyr Thr Thr Thr Glu Ile Asp Leu Asn Asp Ile Met Gln Asn  
1100 1105 1110

Ile Glu Pro Thr Tyr Pro His Gly Leu Arg Val Val Tyr Glu Ser  
1115 1120 1125

Leu Pro Phe Tyr Lys Ala Glu Lys Ile Val Asn Leu Ile Ser Gly  
1130 1135 1140

Thr Lys Ser Ile Thr Asn Ile Leu Glu Lys Thr Ser Ala Ile Asp  
1145 1150 1155

Leu Thr Asp Ile Asp Arg Ala Thr Glu Met Met Arg Lys Asn Ile

1160	1165	1170
Thr Leu Leu Ile Arg Ile Leu Pro Leu Asp Cys Asn Arg Asp Lys		
1175	1180	1185
Arg Glu Ile Leu Ser Met Glu Asn Leu Ser Ile Thr Glu Leu Ser		
1190	1195	1200
Lys Tyr Val Arg Glu Arg Ser Trp Ser Leu Ser Asn Ile Val Gly		
1205	1210	1215
Val Thr Ser Pro Ser Ile Met Tyr Thr Met Asp Ile Lys Tyr Thr		
1220	1225	1230
Thr Ser Thr Ile Ser Ser Gly Ile Ile Ile Glu Lys Tyr Asn Val		
1235	1240	1245
Asn Ser Leu Thr Arg Gly Glu Arg Gly Pro Thr Lys Pro Trp Val		
1250	1255	1260
Gly Ser Ser Thr Gln Glu Lys Lys Thr Met Pro Val Tyr Asn Arg		
1265	1270	1275
Gln Val Leu Thr Lys Lys Gln Arg Asp Gln Ile Asp Leu Leu Ala		
1280	1285	1290
Lys Leu Asp Trp Val Tyr Ala Ser Ile Asp Asn Lys Asp Glu Phe		
1295	1300	1305
Met Glu Glu Leu Ser Ile Gly Thr Leu Gly Leu Thr Tyr Glu Lys		
1310	1315	1320
Ala Lys Lys Leu Phe Pro Gln Tyr Leu Ser Val Asn Tyr Leu His		
1325	1330	1335
Arg Leu Thr Val Ser Ser Arg Pro Cys Glu Phe Pro Ala Ser Ile		
1340	1345	1350
Pro Ala Tyr Arg Thr Thr Asn Tyr His Phe Asp Thr Ser Pro Ile		
1355	1360	1365
Asn Arg Ile Leu Thr Glu Lys Tyr Gly Asp Glu Asp Ile Asp Ile		
1370	1375	1380
Val Phe Gln Asn Cys Ile Ser Phe Gly Leu Ser Leu Met Ser Val		

1385		1390		1395
Val Glu Gln Phe Thr Asn Val	Cys Pro Asn Arg Ile Ile Leu Ile			
1400	1405		1410	
Pro Lys Leu Asn Glu Ile His	Leu Met Lys Pro Pro Ile Phe Thr			
1415	1420		1425	
Gly Asp Val Asp Ile His Lys	Leu Lys Gln Val Ile Gln Lys Gln			
1430	1435		1440	
His Met Phe Leu Pro Asp Lys	Ile Ser Leu Thr Gln Tyr Val Glu			
1445	1450		1455	
Leu Phe Leu Ser Asn Lys Thr	Leu Lys Ser Gly Ser His Val Asn			
1460	1465		1470	
Ser Asn Leu Ile Leu Ala His	Lys Ile Ser Asp Tyr Phe His Asn			
1475	1480		1485	
Thr Tyr Ile Leu Ser Thr Asn	Leu Ala Gly His Trp Ile Leu Ile			
1490	1495		1500	
Ile Gln Leu Met Lys Asp Ser	Lys Gly Ile Phe Glu Lys Asp Trp			
1505	1510		1515	
Gly Glu Gly Tyr Ile Thr Asp	His Met Phe Ile Asn Leu Lys Val			
1520	1525		1530	
Phe Phe Asn Ala Tyr Lys Thr	Tyr Leu Leu Cys Phe His Lys Gly			
1535	1540		1545	
Tyr Gly Lys Ala Lys Leu Glu	Cys Asp Met Asn Thr Ser Asp Leu			
1550	1555		1560	
Leu Cys Val Leu Glu Leu Ile	Asp Ser Ser Tyr Trp Lys Ser Met			
1565	1570		1575	
Ser Lys Val Phe Leu Glu Gln	Lys Val Ile Lys Tyr Ile Leu Ser			
1580	1585		1590	
Gln Asp Ala Ser Leu His Arg	Val Lys Gly Cys His Ser Phe Lys			
1595	1600		1605	
Leu Trp Phe Leu Lys Arg Leu	Asn Val Ala Glu Phe Thr Val Cys			

1610	1615	1620
Pro Trp Val Val Asn Ile Asp Tyr His Pro Thr His Met Lys Ala		
1625	1630	1635
Ile Leu Thr Tyr Ile Asp Leu Val Arg Met Gly Leu Ile Asn Ile		
1640	1645	1650
Asp Arg Ile His Ile Lys Asn Lys His Lys Phe Asn Asp Glu Phe		
1655	1660	1665
Tyr Thr Ser Asn Leu Phe Tyr Ile Asn Tyr Asn Phe Ser Asp Asn		
1670	1675	1680
Thr His Leu Leu Thr Lys His Ile Arg Ile Ala Asn Ser Glu Leu		
1685	1690	1695
Glu Asn Asn Tyr Asn Lys Leu Tyr His Pro Thr Pro Glu Thr Leu		
1700	1705	1710
Glu Asn Ile Leu Ala Asn Pro Ile Lys Ser Asn Asp Lys Lys Thr		
1715	1720	1725
Leu Asn Asp Tyr Cys Ile Gly Lys Asn Val Asp Ser Ile Met Leu		
1730	1735	1740
Pro Leu Leu Ser Asn Lys Lys Leu Ile Lys Ser Ser Ala Met Ile		
1745	1750	1755
Arg Thr Asn Tyr Ser Lys Gln Asp Leu Tyr Asn Leu Phe Pro Met		
1760	1765	1770
Val Val Ile Asp Arg Ile Ile Asp His Ser Gly Asn Thr Ala Lys		
1775	1780	1785
Ser Asn Gln Leu Tyr Thr Thr Thr Ser His Gln Ile Ser Leu Val		
1790	1795	1800
His Asn Ser Thr Ser Leu Tyr Cys Met Leu Pro Trp His His Ile		
1805	1810	1815
Asn Arg Phe Asn Phe Val Phe Ser Ser Thr Gly Cys Lys Ile Ser		
1820	1825	1830
Ile Glu Tyr Ile Leu Lys Asp Leu Lys Ile Lys Asp Pro Asn Cys		



1835	1840	1845
Ile Ala Phe Ile Gly Glu Gly Ala Gly Asn Leu Leu Leu Arg Thr		
1850	1855	1860
Val Val Glu Leu His Pro Asp Ile Arg Tyr Ile Tyr Arg Ser Leu		
1865	1870	1875
Lys Asp Cys Asn Asp His Ser Leu Pro Ile Glu Phe Leu Arg Leu		
1880	1885	1890
Tyr Asn Gly His Ile Asn Ile Asp Tyr Gly Glu Asn Leu Thr Ile		
1895	1900	1905
Pro Ala Thr Asp Ala Thr Asn Asn Ile His Trp Ser Tyr Leu His		
1910	1915	1920
Ile Lys Phe Ala Glu Pro Ile Ser Leu Phe Val Cys Asp Ala Glu		
1925	1930	1935
Leu Ser Val Thr Val Asn Trp Ser Lys Ile Ile Ile Glu Trp Ser		
1940	1945	1950
Lys His Val Arg Lys Cys Lys Tyr Cys Ser Ser Val Asn Lys Cys		
1955	1960	1965
Met Leu Ile Val Lys Tyr His Ala Gln Asp Asp Ile Asp Phe Lys		
1970	1975	1980
Leu Asp Asn Ile Thr Ile Leu Lys Thr Tyr Val Cys Leu Gly Ser		
1985	1990	1995
Lys Leu Lys Gly Ser Glu Val Tyr Leu Val Leu Thr Ile Gly Pro		
2000	2005	2010
Ala Asn Ile Phe Pro Val Phe Asn Val Val Gln Asn Ala Lys Leu		
2015	2020	2025
Ile Leu Ser Arg Thr Lys Asn Phe Ile Met Pro Lys Lys Ala Asp		
2030	2035	2040
Lys Glu Ser Ile Asp Ala Asn Ile Lys Ser Leu Ile Pro Phe Leu		
2045	2050	2055
Cys Tyr Pro Ile Thr Lys Lys Gly Ile Asn Thr Ala Leu Ser Lys		

2060

2065

2070

Leu Lys Ser Val Val Ser Gly Asp Ile Leu Ser Tyr Ser Ile Ala  
2075 2080 2085

Gly Arg Asn Glu Val Phe Ser Asn Lys Leu Ile Asn His Lys His  
2090 2095 2100

Met Asn Ile Leu Lys Trp Phe Asn His Val Leu Asn Phe Arg Ser  
2105 2110 2115

Thr Glu Leu Asn Tyr Asn His Leu Tyr Met Val Glu Ser Thr Tyr  
2120 2125 2130

Pro Tyr Leu Ser Glu Leu Leu Asn Ser Leu Thr Thr Asn Glu Leu  
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Lys Lys Leu Ile Lys Ile Thr Gly Ser Leu Leu Tyr Asn Phe His  
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Asn Glu  
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Glu Cys His Leu Asn Ser Pro Ile Val Lys Gly Lys Ile Ala Gln Leu  
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His Thr Ile Met Ser Leu Pro Gln Pro Tyr Asp Met Asp Asp Asp Ser  
35 40 45

Ile Leu Val Ile Thr Arg Gln Lys Ile Lys Leu Asn Lys Leu Asp Lys  
50 55 60

Arg Gln Arg Ser Ile Arg Arg Leu Lys Leu Ile Leu Thr Glu Lys Val  
65 70 75 80

Asn Asp Leu Gly Lys Tyr Thr Phe Ile Arg Tyr Pro Glu Met Ser Lys  
85 90 95

Glu Met Phe Lys Leu His Ile Pro Gly Ile Asn Ser Lys Val Thr Glu  
 100 105 110

Leu Leu Leu Lys Ala Asp Arg Thr Tyr Ser Gln Met Thr Asp Gly Leu  
 115 120 125

Arg Asp Leu Trp Ile Asn Val Leu Ser Lys Leu Ala Ser Lys Asn Asp  
 130 135 140

Gly Ser Asn Tyr Asp Leu Asn Glu Glu Ile Asn Asn Ile Ser Lys Val  
 145 150 155 160

His Thr Thr Tyr Lys Ser Asp Lys Trp Tyr Asn Pro Phe Lys Thr Trp  
 165 170 175

Phe Thr Ile Lys Tyr Asp Met Arg Arg Leu Gln Lys Ala Arg Asn Glu  
 180 185 190

Val Thr Phe Asn Met Gly Lys Asp Tyr Asn Leu Leu Glu Asp Gln Lys  
 195 200 205

Asn Phe Leu Leu Ile His Pro Glu Leu Val Leu Ile Leu Asp Lys Gln  
 210 215 220

Asn Tyr Asn Gly Tyr Leu Ile Thr Pro Glu Leu Val Leu Pro Tyr Cys  
 225 230 235 240

Asp Val Val Glu Gly Arg Trp Asn Ile Ser Ala Cys Ala Lys Leu Asp  
 245 250 255

Pro Lys Leu Gln Ser Met Tyr Gln Lys Gly Asn Asn Leu Trp Glu Val  
 260 265 270

Ile Asp Lys Leu Phe Pro Ile Met Gly Glu Lys Thr Phe Asp Val Ile  
 275 280 285

Ser Leu Leu Glu Pro Leu Ala Leu Ser Leu Ile Gln Thr His Asp Pro  
 290 295 300

Val Lys Gln Leu Arg Gly Ala Phe Leu Asn His Val Leu Ser Glu Met  
 305 310 315 320

Glu Leu Ile Phe Glu Ser Arg Glu Ser Ile Lys Glu Phe Leu Ser Val  
 325 330 335

Asp Tyr Ile Asp Lys Ile Leu Asp Ile Phe Asn Lys Ser Thr Ile Asp  
 340 345 350

Glu Ile Ala Glu Ile Phe Ser Phe Phe Arg Thr Phe Gly His Pro Pro  
 355 360 365

Leu Glu Ala Ser Ile Ala Ala Glu Lys Val Arg Lys Tyr Met Tyr Ile  
 370 375 380

Gly Lys Gln Leu Lys Phe Asp Thr Ile Asn Lys Cys His Ala Ile Phe  
 385 390 395 400

Cys Thr Ile Ile Ile Asn Gly Tyr Arg Glu Arg His Gly Gly Gln Trp  
 405 410 415

Pro Pro Val Thr Leu Pro Asp His Ala His Glu Phe Ile Ile Asn Ala  
 420 425 430

Tyr Gly Ser Asn Ser Ala Ile Ser Tyr Glu Asn Ala Val Asp Tyr Tyr  
 435 440 445

Gln Ser Phe Ile Gly Ile Lys Phe Asn Lys Phe Ile Glu Pro Gln Leu  
 450 455 460

Asp Glu Asp Leu Thr Ile Tyr Met Lys Asp Lys Ala Leu Ser Pro Lys  
 465 470 475 480

Lys Ser Asn Trp Asp Thr Val Ser Pro Ala Ser Asn Leu Leu Tyr Arg  
 485 490 495

Thr Asn Ala Ser Asn Glu Ser Arg Arg Leu Val Glu Lys Phe Ile Ala  
 500 505 510

Asp Ser Lys Phe Asp Pro Asn Gln Ile Leu Asp Tyr Val Glu Ser Gly  
 515 520 525

Asp Trp Leu Asp Asp Pro Glu Phe Asn Ile Ser Tyr Ser Leu Lys Glu  
 530 535 540

Lys Glu Ile Lys Gln Glu Gly Arg Leu Phe Ala Lys Met Thr Tyr Lys  
 545 550 555 560

Met Arg Ala Thr Gln Val Leu Ser Glu Thr Leu Leu Ala Asn Asn Ile  
 565 570 575

Gly Lys Phe Phe Gln Glu Asn Gly Met Val Lys Gly Glu Ile Glu Leu  
580 585 590

Leu Lys Arg Leu Thr Thr Ile Ser Ile Ser Gly Val Pro Arg Tyr Asn  
595 600 605

Glu Val Tyr Asn Asn Ser Lys Ser His Thr Asp Asp Leu Lys Thr Tyr  
610 615 620

Asn Lys Ile Ser Asn Leu Asn Leu Ser Ser Asn Gln Lys Ser Lys Lys  
625 630 635 640

Phe Glu Phe Lys Ser Thr Asp Ile Tyr Asn Asp Gly Tyr Glu Thr Val  
645 650 655

Ser Cys Phe Leu Thr Thr Asp Leu Lys Lys Tyr Cys Leu Asn Trp Arg  
660 665 670

Tyr Glu Ser Thr Ala Leu Phe Gly Glu Thr Cys Asn Gln Ile Phe Gly  
675 680 685

Leu Asn Lys Leu Phe Asn Trp Leu His Pro Arg Leu Glu Gly Ser Thr  
690 695 700

Ile Tyr Val Gly Asp Pro Tyr Cys Pro Pro Ser Asp Lys Glu His Ile  
705 710 715 720

Ser Leu Glu Asp His Pro Asp Ser Gly Phe Tyr Val His Asn Pro Arg  
725 730 735

Gly Gly Ile Glu Gly Phe Cys Gln Lys Leu Trp Thr Leu Ile Ser Ile  
740 745 750

Ser Ala Ile His Leu Ala Ala Val Arg Ile Gly Val Arg Val Thr Ala  
755 760 765

Met Val Gln Gly Asp Asn Gln Ala Ile Ala Val Thr Thr Arg Val Pro  
770 775 780

Asn Asn Tyr Asp Tyr Arg Val Lys Lys Glu Ile Val Tyr Lys Asp Val  
785 790 795 800

Val Arg Phe Phe Asp Ser Leu Arg Glu Val Met Asp Asp Leu Gly His  
805 810 815

Glu Leu Lys Leu Asn Glu Thr Ile Ile Ser Ser Lys Met Phe Ile Tyr  
820 825 830

Ser Lys Arg Ile Tyr Tyr Asp Gly Arg Ile Leu Pro Gln Ala Leu Lys  
835 840 845

Ala Leu Ser Arg Cys Val Phe Trp Ser Glu Thr Val Ile Asp Glu Thr  
850 855 860

Arg Ser Ala Ser Ser Asn Leu Ala Thr Ser Phe Ala Lys Ala Ile Glu  
865 870 875 880

Asn Gly Tyr Ser Pro Val Leu Gly Tyr Ala Cys Ser Ile Phe Lys Asn  
885 890 895

Ile Gln Gln Leu Tyr Ile Ala Leu Gly Met Asn Ile Asn Pro Thr Ile  
900 905 910

Thr Gln Asn Ile Lys Asp Leu Tyr Phe Arg Asn Pro Asn Trp Met Gln  
915 920 925

Tyr Ala Ser Leu Ile Pro Ala Ser Val Gly Gly Phe Asn Tyr Met Ala  
930 935 940

Met Ser Arg Cys Phe Val Arg Asn Ile Gly Asp Pro Ser Val Ala Ala  
945 950 955 960

Leu Ala Asp Ile Lys Arg Phe Ile Lys Ala Asn Leu Leu Asp Arg Ser  
965 970 975

Val Leu Tyr Arg Ile Met Asn Gln Glu Pro Gly Glu Ser Ser Phe Leu  
980 985 990

Asp Trp Ala Ser Asp Pro Tyr Ser Cys Asn Leu Pro Gln Ser Gln Asn  
995 1000 1005

Ile Thr Thr Met Ile Lys Asn Ile Thr Ala Arg Asn Val Leu Gln  
1010 1015 1020

Asp Ser pro Asn Pro Leu Leu Ser Gly Leu Phe Thr Asn Thr Met  
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Ile Glu Glu Asp Glu Glu Leu Ala Glu Phe Leu Met Asp Arg Lys  
1040 1045 1050

Val Ile Leu Pro Arg Val Ala His Asp Ile Leu Asp Asn Ser Leu  
1055 1060 1065

Thr Gly Ile Arg Asn Ala Ile Ala Gly Met Leu Asp Thr Thr Lys  
1070 1075 1080

Ser Leu Ile Arg Val Gly Ile Asn Arg Gly Gly Leu Thr Tyr Ser  
1085 1090 1095

Leu Leu Arg Lys Ile Ser Asn Tyr Asp Leu Val Gln Tyr Glu Thr  
1100 1105 1110

Leu Ser Arg Thr Leu Arg Leu Ile Val Ser Asp Lys Ile Arg Tyr  
1115 1120 1125

Glu Asp Met Cys Ser Val Asp Leu Ala Ile Ala Leu Arg Gln Lys  
1130 1135 1140

Met Trp Ile His Leu Ser Gly Gly Arg Met Ile Ser Gly Leu Glu  
1145 1150 1155

Thr Pro Asp Pro Leu Glu Leu Leu Ser Gly Val Ile Ile Thr Gly  
1160 1165 1170

Ser Glu His Cys Lys Ile Cys Tyr Ser Ser Asp Gly Thr Asn Pro  
1175 1180 1185

Tyr Thr Trp Met Tyr Leu Pro Gly Asn Ile Lys Ile Gly Ser Ala  
1190 1195 1200

Glu Thr Gly Ile Ser Ser Leu Arg Val Pro Tyr Phe Gly Ser Val  
1205 1210 1215

Thr Asp Glu Arg Ser Glu Ala Gln Leu Gly Tyr Ile Lys Asn Leu  
1220 1225 1230

Ser Lys Pro Ala Lys Ala Ala Ile Arg Ile Ala Met Ile Tyr Thr  
1235 1240 1245

Trp Ala Phe Gly Asn Asp Glu Ile Ser Trp Met Glu Ala Ser Gln  
1250 1255 1260

Ile Ala Gln Thr Arg Ala Asn Phe Thr Leu Asp Ser Leu Lys Ile  
1265 1270 1275

Leu Thr Pro Val Ala Thr Ser Thr Asn Leu Ser His Arg Leu Lys  
 1280 1285 1290

Asp Thr Ala Thr Gln Met Lys Phe Ser Ser Thr Ser Leu Ile Arg  
 1295 1300 1305

Val Ser Arg Phe Ile Thr Met Ser Asn Asp Asn Met Ser Ile Lys  
 1310 1315 1320

Glu Ala Asn Glu Thr Lys Asp Thr Asn Leu Ile Tyr Gln Gln Ile  
 1325 1330 1335

Met Leu Thr Gly Leu Ser Val Phe Glu Tyr Leu Phe Arg Leu Glu  
 1340 1345 1350

Glu Thr Thr Gly His Asn Pro Ile Val Met His Leu His Ile Glu  
 1355 1360 1365

Asp Glu Cys Cys Ile Lys Glu Ser Phe Asn Asp Glu His Ile Asn  
 1370 1375 1380

Pro Glu Ser Thr Leu Glu Leu Ile Arg Tyr Pro Glu Ser Asn Glu  
 1385 1390 1395

Phe Ile Tyr Asp Lys Asp Pro Leu Lys Asp Val Asp Leu Ser Lys  
 1400 1405 1410

Leu Met Val Ile Lys Asp His Ser Tyr Thr Ile Asp Met Asn Tyr  
 1415 1420 1425

Trp Asp Asp Thr Asp Ile Ile His Ala Ile Ser Ile Cys Thr Ala  
 1430 1435 1440

Ile Thr Ile Ala Asp Thr Met Ser Gln Leu Asp Arg Asp Asn Leu  
 1445 1450 1455

Lys Glu Ile Ile Val Ile Ala Asn Asp Asp Asp Ile Asn Ser Leu  
 1460 1465 1470

Ile Thr Glu Phe Leu Thr Leu Asp Ile Leu Val Phe Leu Lys Thr  
 1475 1480 1485

Phe Gly Gly Leu Leu Val Asn Gln Phe Ala Tyr Thr Leu Tyr Ser  
 1490 1495 1500



Leu Lys Thr Glu Gly Arg Asp Leu Ile Trp Asp Tyr Ile Met Arg  
 1505 1510 1515

Thr Leu Arg Asp Thr Ser His Ser Ile Leu Lys Val Leu Ser Asn  
 1520 1525 1530

Ala Leu Ser His Pro Lys Val Phe Lys Arg Phe Trp Asp Cys Gly  
 1535 1540 1545

Val Leu Asn Pro Ile Tyr Gly Pro Asn Thr Ala Ser Gln Asp Gln  
 1550 1555 1560

Ile Lys Leu Ala Leu Ser Ile Cys Glu Tyr Ser Leu Asp Leu Phe  
 1565 1570 1575

Met Arg Glu Trp Leu Asn Gly Val Ser Leu Glu Ile Tyr Ile Cys  
 1580 1585 1590

Asp Ser Asp Met Glu Val Ala Asn Asp Arg Lys Gln Ala Phe Ile  
 1595 1600 1605

Ser Arg His Leu Ser Phe Val Cys Cys Leu Ala Glu Ile Ala Ser  
 1610 1615 1620

Phe Gly Pro Asn Leu Leu Asn Leu Thr Tyr Leu Glu Arg Leu Asp  
 1625 1630 1635

Leu Leu Lys Gln Tyr Leu Glu Leu Asn Ile Lys Asp Asp Pro Thr  
 1640 1645 1650

Leu Lys Tyr Val Gln Ile Ser Gly Leu Leu Ile Lys Ser Phe Pro  
 1655 1660 1665

Ser Thr Val Thr Tyr Val Arg Lys Thr Ala Ile Lys Tyr Leu Arg  
 1670 1675 1680

Ile Arg Gly Ile Ser Pro Pro Glu Val Ile Asp Asp Trp Asp Pro  
 1685 1690 1695

Ile Glu Asp Glu Asn Met Leu Asp Asn Ile Val Lys Thr Ile Asn  
 1700 1705 1710

Asp Asn Cys Asn Lys Asp Asn Lys Gly Asn Lys Ile Asn Asn Phe  
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Trp Gly Leu Ala Leu Lys Asn Tyr Gln Val Leu Lys Ile Arg Ser  
1730 1735 1740

Ile Thr Ser Asp Ser Asp Asn Asn Asp Arg Ser Asp Ala Ser Thr  
1745 1750 1755

Gly Gly Leu Thr Leu Pro Gln Gly Gly Asn Tyr Leu Ser His Gln  
1760 1765 1770

Leu Arg Leu Phe Gly Ile Asn Ser Thr Ser Cys Leu Lys Ala Leu  
1775 1780 1785

Glu Leu Ser Gln Ile Leu Met Lys Glu Val Asn Lys Asp Gln Asp  
1790 1795 1800

Arg Leu Phe Leu Gly Glu Gly Ala Gly Ala Met Leu Ala Cys Tyr  
1805 1810 1815

Asp Ala Thr Leu Gly Pro Ala Val Asn Tyr Tyr Asn Ser Gly Leu  
1820 1825 1830

Asn Ile Thr Asp Val Ile Gly Gln Arg Glu Leu Lys Ile Phe Pro  
1835 1840 1845

Ser Glu Val Ser Leu Val Gly Lys Lys Leu Gly Asn Val Thr Gln  
1850 1855 1860

Ile Leu Asn Arg Val Lys Val Leu Phe Asn Gly Asn Pro Asn Ser  
1865 1870 1875

Thr Trp Ile Gly Asn Met Glu Cys Glu Thr Leu Ile Trp Ser Glu  
1880 1885 1890

Leu Asn Asp Lys Ser Ile Gly Leu Val His Cys Asp Met Glu Gly  
1895 1900 1905

Ala Ile Gly Lys Ser Glu Glu Thr Val Leu His Glu His Tyr Ser  
1910 1915 1920

Val Ile Arg Ile Thr Tyr Leu Ile Gly Asp Asp Asp Val Val Leu  
1925 1930 1935

Ile Ser Lys Ile Ile Pro Thr Ile Thr Pro Asn Trp Ser Arg Ile  
1940 1945 1950

Leu Tyr Leu Tyr Lys Leu Tyr Trp Lys Asp Val Ser Ile Ile Ser  
1955 1960 1965

Leu Lys Thr Ser Asn Pro Ala Ser Thr Glu Leu Tyr Leu Ile Ser  
1970 1975 1980

Lys Asp Ala Tyr Cys Thr Ile Met Glu Pro Ser Glu Val Val Leu  
1985 1990 1995

Ser Lys Leu Lys Arg Leu Ser Leu Leu Glu Glu Asn Asn Leu Leu  
2000 2005 2010

Lys Trp Ile Ile Leu Ser Lys Lys Lys Asn Asn Glu Trp Leu His  
2015 2020 2025

His Glu Ile Lys Glu Gly Glu Arg Asp Tyr Gly Val Met Arg Pro  
2030 2035 2040

Tyr His Met Ala Leu Gln Ile Phe Gly Phe Gln Ile Asn Leu Asn  
2045 2050 2055

His Leu Ala Lys Glu Phe Leu Ser Thr Pro Asp Leu Thr Asn Ile  
2060 2065 2070

Asn Asn Ile Ile Gln Ser Phe Gln Arg Thr Ile Lys Asp Val Leu  
2075 2080 2085

Phe Glu Trp Ile Asn Ile Thr His Asp Gly Lys Arg His Lys Leu  
2090 2095 2100

Gly Gly Arg Tyr Asn Ile Phe Pro Leu Lys Asn Lys Gly Lys Leu  
2105 2110 2115

Arg Leu Leu Ser Arg Arg Leu Val Leu Ser Trp Ile Ser Leu Ser  
2120 2125 2130

Leu Ser Thr Arg Leu Leu Thr Gly Arg Phe Pro Asp Glu Lys Phe  
2135 2140 2145

Glu His Arg Ala Gln Thr Gly Tyr Val Ser Leu Pro Asp Thr Asp  
2150 2155 2160

Leu Glu Ser Leu Lys Leu Leu Ser Lys Asn Thr Ile Lys Asn Tyr  
2165 2170 2175

Arg Glu Cys Ile Gly Ser Ile Ser Tyr Trp Phe Leu Thr Lys Glu  
 2180 2185 2190

Val Lys Ile Leu Met Lys Leu Ile Gly Gly Ala Lys Leu Leu Gly  
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Ile Pro Arg Gln Tyr Lys Glu Pro Glu Glu Gln Leu Leu Glu Asp  
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Tyr Asn Gln His Asp Glu Phe Asp Ile Asp  
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Glu Cys His Leu Asn Ser Pro Ile Val Lys Ser Lys Ile Ala Gln Leu  
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His Val Leu Leu Asp Ile Asn Gln Pro Tyr Asp Leu Lys Asp Asn Ser  
 35 40 45

Ile Ile Asn Ile Thr Lys Tyr Lys Ile Arg Asn Gly Gly Leu Ser Pro  
 50 55 60

Arg Gln Ile Lys Ile Arg Ser Leu Gly Lys Ile Leu Lys Gln Glu Ile  
 65 70 75 80

Lys Asp Ile Asp Arg Tyr Thr Phe Glu Pro Tyr Pro Ile Phe Ser Leu  
 85 90 95

Glu Leu Leu Arg Leu Asp Ile Pro Glu Ile Cys Asp Lys Ile Arg Ser  
 100 105 110

Ile Phe Ser Val Ser Asp Arg Leu Ile Arg Glu Leu Ser Ser Gly Phe  
 115 120 125

Gln Glu Leu Trp Leu Asn Ile Leu Arg Gln Leu Gly Cys Val Glu Gly  
 130 135 140

Lys Glu Gly Phe Asp Ser Leu Lys Asp Val Asp Ile Ile Pro Asp Ile  
145 150 155 160

Thr Asp Lys Tyr Asn Lys Asn Thr Trp Tyr Arg Pro Phe Leu Thr Trp  
165 170 175

Phe Ser Ile Lys Tyr Asp Met Arg Trp Met Gln Lys Asn Lys Ser Gly  
180 185 190

Asn His Leu Asp Val Ser Asn Ser His Asn Phe Leu Asp Cys Lys Ser  
195 200 205

Tyr Ile Leu Ile Ile Tyr Arg Asp Leu Val Ile Ile Ile Asn Lys Leu  
210 215 220

Lys Leu Thr Gly Tyr Val Leu Thr Pro Glu Leu Val Leu Met Tyr Cys  
225 230 235 240

Asp Val Val Glu Gly Arg Trp Asn Met Ser Ser Ala Gly Arg Leu Asp  
245 250 255

Lys Arg Ser Ser Lys Ile Thr Cys Lys Gly Glu Glu Leu Trp Glu Leu  
260 265 270

Ile Asp Ser Leu Phe Pro Asn Leu Gly Glu Asp Val Tyr Asn Ile Ile  
275 280 285

Ser Leu Leu Glu Pro Leu Ser Leu Ala Leu Ile Gln Leu Asp Asp Pro  
290 295 300

Val Thr Asn Leu Lys Gly Ala Phe Met Arg His Val Leu Thr Glu Leu  
305 310 315 320

His Thr Ile Leu Ile Lys Asp Asn Ile Tyr Thr Asp Ser Glu Ala Asp  
325 330 335

Ser Ile Met Glu Ser Leu Ile Lys Ile Phe Arg Glu Thr Ser Ile Asp  
340 345 350

Glu Lys Ala Glu Ile Phe Ser Phe Phe Arg Thr Phe Gly His Pro Ser  
355 360 365

Leu Glu Ala Ile Thr Ala Ala Asp Lys Val Arg Thr His Met Tyr Ser  
370 375 380

Ser Lys Lys Ile Ile Leu Lys Thr Leu Tyr Glu Cys His Ala Ile Phe  
 385 390 395 400

Cys Ala Ile Ile Ile Asn Gly Tyr Arg Glu Arg His Gly Gly Gln Trp  
 405 410 415

Pro Pro Cys Glu Phe Pro Asn His Val Cys Leu Glu Leu Lys Asn Ala  
 420 425 430

Gln Gly Ser Asn Ser Ala Ile Ser Tyr Glu Cys Ala Val Asp Asn Tyr  
 435 440 445

Ser Ser Phe Ile Gly Phe Lys Phe Leu Lys Phe Ile Glu Pro Gln Leu  
 450 455 460

Asp Glu Asp Leu Thr Ile Tyr Met Lys Asp Lys Ala Leu Ser Pro Arg  
 465 470 475 480

Lys Ala Ala Trp Asp Ser Val Tyr Pro Asp Ser Asn Leu Tyr Tyr Lys  
 485 490 495

Val Pro Glu Ser Glu Glu Thr Arg Arg Leu Ile Glu Val Phe Ile Asn  
 500 505 510

Asp Asn Asn Phe Asn Pro Ala Asp Ile Ile Asn Tyr Val Glu Ser Gly  
 515 520 525

Glu Trp Leu Asn Asp Asp Ser Phe Asn Ile Ser Tyr Ser Leu Lys Glu  
 530 535 540

Lys Glu Ile Lys Gln Glu Gly Arg Leu Phe Ala Lys Met Thr Tyr Lys  
 545 550 555 560

Met Arg Ala Val Gln Val Leu Ala Glu Thr Leu Leu Ala Lys Gly Val  
 565 570 575

Gly Glu Leu Phe Ser Glu Asn Gly Met Val Lys Gly Glu Ile Asp Leu  
 580 585 590

Leu Lys Arg Leu Thr Thr Leu Ser Val Ser Gly Val Pro Arg Ser Asn  
 595 600 605

Ser Val Tyr Asn Asn Pro Ile Leu His Glu Lys Leu Ile Lys Asn Met  
 610 615 620

Asn Lys Cys Asn Ser Asn Gly Tyr Trp Asp Glu Arg Lys Lys Ser Lys  
625 630 635 640

Asn Glu Phe Lys Ala Ala Asp Ser Ser Thr Glu Gly Tyr Glu Thr Leu  
645 650 655

Ser Cys Phe Leu Thr Thr Asp Leu Lys Lys Tyr Cys Leu Asn Trp Arg  
660 665 670

Phe Glu Ser Thr Ala Leu Phe Gly Gln Arg Cys Asn Glu Ile Phe Gly  
675 680 685

Phe Lys Thr Phe Phe Asn Trp Met His Pro Ile Leu Glu Lys Ser Thr  
690 695 700

Ile Tyr Val Gly Asp Pro Tyr Cys Pro Val Pro Asp Arg Met His Lys  
705 710 715 720

Glu Leu Gln Asp His Asp Asp Thr Gly Ile Phe Ile His Asn Pro Arg  
725 730 735

Gly Gly Ile Glu Gly Tyr Cys Gln Lys Leu Trp Thr Leu Ile Ser Ile  
740 745 750

Ser Ala Ile His Leu Ala Ala Val Lys Val Gly Val Arg Val Ser Ala  
755 760 765

Met Val Gln Gly Asp Asn Gln Ala Ile Ala Val Thr Ser Arg Val Pro  
770 775 780

Val Thr Gln Thr Tyr Lys Gln Lys Lys Thr His Val Tyr Glu Glu Ile  
785 790 795 800

Thr Arg Tyr Phe Gly Ala Leu Arg Glu Val Met Phe Asp Ile Gly His  
805 810 815

Glu Leu Lys Leu Asn Glu Thr Ile Ile Ser Ser Lys Met Phe Val Tyr  
820 825 830

Ser Lys Arg Ile Tyr Tyr Asp Gly Lys Ile Leu Pro Gln Cys Leu Lys  
835 840 845

Ala Leu Thr Arg Cys Val Phe Trp Ser Glu Thr Leu Val Asp Glu Asn  
850 855 860

Arg Ser Ala Cys Ser Asn Ile Ala Thr Ser Ile Ala Lys Ala Ile Glu  
865 870 875 880

Asn Gly Tyr Ser Pro Ile Leu Gly Tyr Cys Ile Ala Leu Phe Lys Thr  
885 890 895

Cys Gln Gln Val Cys Ile Ser Leu Gly Met Thr Ile Asn Pro Thr Ile  
900 905 910

Thr Ser Thr Ile Lys Asp Gln Tyr Phe Lys Gly Lys Asn Trp Leu Arg  
915 920 925

Cys Ala Ile Leu Ile Pro Ala Asn Ile Gly Gly Phe Asn Tyr Met Ser  
930 935 940

Thr Ala Arg Cys Phe Val Arg Asn Ile Gly Asp Pro Ala Val Ala Ala  
945 950 955 960

Leu Ala Asp Leu Lys Arg Phe Ile Lys Ala Gly Leu Leu Asp Lys Gln  
965 970 975

Val Leu Tyr Arg Val Met Asn Gln Glu Pro Gly Asp Ser Ser Phe Leu  
980 985 990

Asp Trp Ala Ser Asp Pro Tyr Ser Cys Asn Leu Pro His Ser Gln Ser  
995 1000 1005

Ile Thr Thr Ile Ile Lys Asn Val Thr Ala Arg Ser Val Leu Gln  
1010 1015 1020

Glu Ser Pro Asn Pro Leu Leu Ser Gly Leu Phe Ser Glu Ser Ser  
1025 1030 1035

Ser Glu Glu Asp Leu Asn Leu Ala Ser Phe Leu Met Asp Arg Lys  
1040 1045 1050

Ala Ile Leu Pro Arg Val Ala His Glu Ile Leu Asp Asn Ser Leu  
1055 1060 1065

Thr Gly Val Arg Glu Ala Ile Ala Gly Met Leu Asp Thr Thr Lys  
1070 1075 1080

Ser Leu Val Arg Ala Ser Val Arg Arg Gly Gly Leu Ser Tyr Ser  
1085 1090 1095



Ile Leu	Arg Arg Leu	Ile Asn	Tyr Asp	Leu Leu	Gln Tyr Glu Thr
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Leu Thr	Arg Thr Leu	Arg Lys	Pro Val	Lys Asp	Asn Ile Glu Tyr
1115		1120			1125
Glu Tyr	Met Cys Ser	Val Glu	Leu Ala	Ile Gly	Leu Arg Gln Lys
1130		1135			1140
Met Trp	Phe His Leu	Thr Tyr	Gly Arg	Pro Ile	His Gly Leu Glu
1145		1150			1155
Thr Pro	Asp Pro Leu	Glu Leu	Leu Arg	Gly Ser	Phe Ile Glu Gly
1160		1165			1170
Ser Glu	Ile Cys Lys	Phe Cys	Arg Ser	Glu Gly	Asn Asn Pro Met
1175		1180			1185
Tyr Thr	Trp Phe Tyr	Leu Pro	Asp Asn	Ile Asp	Leu Asp Thr Leu
1190		1195			1200
Ser Asn	Gly Ser Pro	Ala Ile	Arg Ile	Pro Tyr	Phe Gly Ser Ala
1205		1210			1215
Thr Asp	Glu Arg Ser	Glu Ala	Gln Leu	Gly Tyr	Val Lys Asn Leu
1220		1225			1230
Ser Lys	Pro Ala Lys	Ala Ala	Ile Arg	Ile Ala	Met Val Tyr Thr
1235		1240			1245
Trp Ala	Tyr Gly Thr	Asp Glu	Ile Ser	Trp Met	Glu Ala Ala Leu
1250		1255			1260
Ile Ala	Gln Thr Arg	Ala Asn	Leu Ser	Leu Glu	Asn Leu Lys Leu
1265		1270			1275
Leu Thr	Pro Val Ser	Thr Ser	Thr Asn	Leu Ser	His Arg Leu Arg
1280		1285			1290
Asp Thr	Ala Thr Gln	Met Lys	Phe Ser	Ser Ala	Thr Leu Val Arg
1295		1300			1305
Ala Ser	Arg Phe Ile	Thr Ile	Ser Asn	Asp Asn	Met Ala Leu Lys
1310		1315			1320

Glu Ala Gly Glu Ser Lys Asp Thr Asn Leu Val Tyr Gln Gln Ile  
 1325 1330 1335

Met Leu Thr Gly Leu Ser Leu Phe Glu Phe Asn Met Arg Tyr Lys  
 1340 1345 1350

Gln Gly Ser Leu Ser Lys Pro Met Ile Leu His Leu His Leu Asn  
 1355 1360 1365

Asn Lys Cys Cys Ile Ile Glu Ser Pro Gln Glu Leu Asn Ile Pro  
 1370 1375 1380

Pro Arg Ser Thr Leu Asp Leu Glu Ile Thr Gln Glu Asn Asn Lys  
 1385 1390 1395

Leu Ile Tyr Asp Pro Asp Pro Leu Lys Asp Ile Asp Leu Glu Leu  
 1400 1405 1410

Phe Ser Lys Val Arg Asp Val Val His Thr Ile Asp Met Asn Tyr  
 1415 1420 1425

Trp Ser Asp Asp Glu Ile Ile Arg Ala Thr Ser Ile Cys Thr Ala  
 1430 1435 1440

Met Thr Ile Ala Asp Thr Met Ser Gln Leu Asp Arg Asp Asn Leu  
 1445 1450 1455

Lys Glu Met Ile Ala Leu Ile Asn Asp Asp Asp Ile Asn Ser Leu  
 1460 1465 1470

Ile Thr Glu Phe Met Val Ile Asp Ile Pro Leu Phe Cys Ser Thr  
 1475 1480 1485

Phe Gly Gly Ile Leu Ile Asn Gln Phe Ala Tyr Ser Leu Tyr Gly  
 1490 1495 1500

Leu Asn Val Arg Gly Arg Asp Glu Ile Trp Gly Tyr Val Ile Arg  
 1505 1510 1515

Ile Ile Lys Asp Thr Ser His Ala Val Leu Lys Val Leu Ser Asn  
 1520 1525 1530

Ala Leu Ser His Pro Lys Ile Phe Lys Arg Phe Trp Asp Ala Gly  
 1535 1540 1545

Val	Val	Glu	Pro	Val	Tyr	Gly	Pro	Asn	Leu	Ser	Asn	Glu	Asp	Lys
1550						1555					1560			
Ile	Leu	Leu	Ala	Ile	Ser	Val	Cys	Glu	Tyr	Ser	Val	Asp	Leu	Phe
1565						1570					1575			
Met	Arg	Asp	Trp	Gln	Glu	Gly	Ile	Pro	Leu	Glu	Ile	Phe	Ile	Cys
1580						1585					1590			
Asp	Asn	Asp	Pro	Asn	Ile	Ala	Glu	Met	Arg	Lys	Leu	Ser	Phe	Leu
1595						1600					1605			
Ala	Arg	His	Leu	Ala	Tyr	Leu	Cys	Ser	Leu	Ala	Glu	Ile	Ala	Lys
1610						1615					1620			
Glu	Gly	Pro	Lys	Leu	Glu	Ser	Met	Thr	Ser	Leu	Glu	Arg	Leu	Glu
1625						1630					1635			
Ser	Leu	Lys	Glu	Tyr	Leu	Glu	Leu	Thr	Phe	Leu	Asp	Asp	Pro	Ile
1640						1645					1650			
Leu	Arg	Tyr	Ser	Gln	Leu	Thr	Gly	Leu	Val	Ile	Lys	Ile	Phe	Pro
1655						1660					1665			
Ser	Thr	Leu	Thr	Tyr	Ile	Arg	Lys	Ser	Ser	Ile	Lys	Val	Leu	Arg
1670						1675					1680			
Val	Arg	Gly	Ile	Gly	Ile	Pro	Glu	Val	Leu	Glu	Asp	Trp	Asp	Pro
1685						1690					1695			
Asp	Ala	Asp	Ser	Met	Leu	Leu	Asp	Asn	Ile	Thr	Ala	Glu	Val	Gln
1700						1705					1710			
His	Asn	Ile	Pro	Leu	Lys	Lys	Asn	Glu	Arg	Thr	Pro	Phe	Trp	Gly
1715						1720					1725			
Leu	Arg	Val	Ser	Lys	Ser	Gln	Val	Leu	Arg	Leu	Arg	Gly	Tyr	Glu
1730						1735					1740			
Glu	Ile	Lys	Arg	Glu	Glu	Arg	Gly	Arg	Ser	Gly	Val	Gly	Leu	Thr
1745						1750					1755			
Leu	Pro	Phe	Asp	Gly	Arg	Tyr	Leu	Ser	His	Gln	Leu	Arg	Leu	Phe
1760						1765					1770			

Gly Ile	Asn Ser Thr	Ser Cys	Leu Lys Ala Leu	Glu Leu Thr Tyr
1775		1780		1785
Leu Leu	Asn Pro Leu Val Asn	Lys Asp Lys Asp	Arg Leu Tyr Leu	
1790		1795		1800
Gly Glu	Gly Ala Gly Ala Met	Leu Ser Cys Tyr	Asp Ala Thr Leu	
1805		1810		1815
Gly Pro	Cys Met Asn Tyr Tyr	Asn Ser Gly Val	Asn Ser Cys Asp	
1820		1825		1830
Leu Asn	Gly Gln Arg Glu Leu	Asn Ile Tyr Pro	Ser Glu Val Ala	
1835		1840		1845
Leu Val	Gly Lys Lys Leu Asn	Asn Val Thr Ser	Leu Cys Gln Arg	
1850		1855		1860
Val Lys	Val Leu Phe Asn Gly	Asn Pro Gly Ser	Thr Trp Ile Gly	
1865		1870		1875
Asn Asp	Glu Cys Glu Thr Leu	Ile Trp Asn Glu	Leu Gln Asn Asn	
1880		1885		1890
Ser Ile	Gly Phe Ile His Cys	Asp Met Glu Gly	Gly Glu His Lys	
1895		1900		1905
Cys Asp	Gln Val Val Leu His	Glu His Tyr Ser	Val Ile Arg Ile	
1910		1915		1920
Ala Tyr	Leu Val Gly Asp Lys	Asp Val Ile Leu Val	Ser Lys Ile	
1925		1930		1935
Ala Pro	Arg Leu Gly Thr Asp	Trp Thr Lys Gln	Leu Ser Leu Tyr	
1940		1945		1950
Leu Arg	Tyr Trp Arg Asp Val	Ser Leu Ile Val	Leu Lys Thr Ser	
1955		1960		1965
Asn Pro	Ala Ser Thr Glu Met	Tyr Leu Ile Ser	Lys Asp Pro Lys	
1970		1975		1980
Ser Asp	Ile Ile Glu Asp Ser	Asn Thr Val Leu Ala	Asn Leu Leu	
1985		1990		1995

Pro Leu Ser Lys Glu Asp Ser Ile Lys Ile Glu Lys Trp Ile Leu  
2000 2005 2010

Val Glu Lys Ala Lys Val His Asp Trp Ile Val Arg Glu Leu Lys  
2015 2020 2025

Glu Gly Ser Ala Ser Ser Gly Met Leu Arg Pro Tyr His Gln Ala  
2030 2035 2040

Leu Gln Ile Phe Gly Phe Glu Pro Asn Leu Asn Lys Leu Cys Arg  
2045 2050 2055

Asp Phe Leu Ser Thr Leu Asn Ile Val Asp Thr Lys Asn Cys Ile  
2060 2065 2070

Ile Thr Phe Asp Arg Val Leu Arg Asp Thr Ile Phe Glu Trp Thr  
2075 2080 2085

Arg Ile Lys Asp Ala Asp Lys Lys Leu Arg Leu Thr Gly Lys Tyr  
2090 2095 2100

Asp Leu Tyr Pro Leu Arg Asp Ser Gly Lys Leu Lys Val Ile Ser  
2105 2110 2115

Arg Arg Leu Val Ile Ser Trp Ile Ala Leu Ser Met Ser Thr Arg  
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Leu Val Thr Gly Ser Phe Pro Asp Ile Lys Phe Glu Ser Arg Leu  
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Gln Leu Gly Ile Val Ser Ile Ser Ser Arg Glu Ile Lys Asn Leu  
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His Ser Val Thr Tyr Arg Phe Leu Thr Lys Glu Ile Lys Ile Leu  
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 35 40 45

Ile Leu Ile Ile Thr Arg Gln Lys Ile Lys Leu Asn Lys Leu Asp Lys  
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Arg Gln Arg Ser Ile Arg Lys Leu Arg Ser Val Leu Met Glu Arg Val  
 65 70 75 80

Ser Asp Leu Gly Lys Tyr Thr Phe Ile Arg Tyr Pro Glu Met Ser Ser  
 85 90 95

Glu Met Phe Gln Leu Cys Ile Pro Gly Ile Asn Asn Lys Ile Asn Glu  
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Leu Leu Ser Lys Ala Ser Lys Thr Tyr Asn Gln Met Thr Asp Gly Leu  
 115 120 125

Arg Asp Leu Trp Val Thr Ile Leu Ser Lys Leu Ala Ser Lys Asn Asp  
 130 135 140

Gly Ser Asn Tyr Asp Ile Asn Glu Asp Ile Ser Asn Ile Ser Asn Val  
 145 150 155 160

His Met Thr Tyr Gln Ser Asp Lys Trp Tyr Asn Pro Phe Lys Thr Trp  
 165 170 175

Phe Thr Ile Lys Tyr Asp Met Arg Arg Leu Gln Lys Ala Lys Asn Glu  
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Ile Thr Phe Asn Arg His Lys Asp Tyr Asn Leu Leu Glu Asp Gln Lys  
 195 200 205

Asn Ile Leu Leu Ile His Pro Glu Leu Val Leu Ile Leu Asp Lys Gln  
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Asn Tyr Asn Gly Tyr Ile Met Thr Pro Glu Leu Val Leu Met Tyr Cys  
 225 230 235 240

Asp Val Val Glu Gly Arg Trp Asn Ile Ser Ser Cys Ala Lys Leu Asp  
 245 250 255

Pro Lys Leu Gln Ser Met Tyr Tyr Lys Gly Asn Asn Leu Trp Glu Ile  
 260 265 270

Ile Asp Gly Leu Phe Ser Thr Leu Gly Glu Arg Thr Phe Asp Ile Ile  
 275 280 285

Ser Leu Leu Glu Pro Leu Ala Leu Ser Leu Ile Gln Thr Tyr Asp Pro  
 290 295 300

Val Lys Gln Leu Arg Gly Ala Phe Leu Asn His Val Leu Ser Glu Met  
 305 310 315 320

Glu Leu Ile Phe Ala Ala Glu Cys Thr Thr Glu Glu Ile Pro Asn Val  
 325 330 335

Asp Tyr Ile Asp Lys Ile Leu Asp Val Phe Lys Glu Ser Thr Ile Asp  
 340 345 350

Glu Ile Ala Glu Ile Phe Ser Phe Phe Arg Thr Phe Gly His Pro Pro  
 355 360 365

Leu Glu Ala Ser Ile Ala Ala Glu Lys Val Arg Lys Tyr Met Tyr Thr  
 370 375 380

Glu Lys Cys Leu Lys Phe Asp Thr Ile Asn Lys Cys His Ala Ile Phe  
 385 390 395 400

Cys Thr Ile Ile Ile Asn Gly Tyr Arg Glu Arg His Gly Gly Gln Trp  
 405 410 415

Pro Pro Val Thr Leu Pro Val His Ala His Glu Phe Ile Ile Asn Ala  
 420 425 430

Tyr Gly Ser Asn Ser Ala Ile Ser Tyr Glu Asn Ala Val Asp Tyr Tyr  
 435 440 445

Lys Ser Phe Ile Gly Ile Lys Phe Asp Lys Phe Ile Glu Pro Gln Leu  
 450 455 460

Asp Glu Asp Leu Thr Ile Tyr Met Lys Asp Lys Ala Leu Ser Pro Lys  
 465 470 475 480

Lys Ser Asn Trp Asp Thr Val Tyr Pro Ala Ser Asn Leu Leu Tyr Arg  
 485 490 495

Thr Asn Val Ser His Asp Ser Arg Arg Leu Val Glu Val Phe Ile Ala  
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Asp Ser Lys Phe Asp Pro His Gln Val Leu Asp Tyr Val Glu Ser Gly  
 515 520 525

Tyr Trp Leu Asp Asp Pro Glu Phe Asn Ile Ser Tyr Ser Leu Lys Glu  
 530 535 540

Lys Glu Ile Lys Gln Glu Gly Arg Leu Phe Ala Lys Met Thr Tyr Lys  
 545 550 555 560

Met Arg Ala Thr Gln Val Leu Ser Glu Thr Leu Leu Ala Asn Asn Ile  
 565 570 575

Gly Lys Phe Phe Gln Glu Asn Gly Met Val Lys Gly Glu Ile Glu Leu  
 580 585 590

Leu Lys Arg Leu Thr Thr Ile Ser Met Ser Gly Val Pro Arg Tyr Asn  
 595 600 605

Glu Val Tyr Asn Asn Ser Lys Ser His Thr Glu Glu Leu Gln Ala Tyr  
 610 615 620

Asn Ala Ile Ser Ser Ser Asn Leu Ser Ser Asn Gln Lys Ser Lys Lys  
 625 630 635 640

Phe Glu Phe Lys Ser Thr Asp Ile Tyr Asn Asp Gly Tyr Glu Thr Val  
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Ser Cys Phe Leu Thr Thr Asp Leu Lys Lys Tyr Cys Leu Asn Trp Arg  
 660 665 670

Tyr Glu Ser Thr Ala Leu Phe Gly Asp Thr Cys Asn Gln Ile Phe Gly  
 675 680 685



Leu Lys Glu Leu Phe Asn Trp Leu His Pro Arg Leu Glu Lys Ser Thr  
 690 695 700

Ile Tyr Val Gly Asp Pro Tyr Cys Pro Pro Ser Asp Ile Glu His Leu  
 705 710 715 720

Pro Leu Asp Asp His Pro Asp Ser Gly Phe Tyr Val His Asn Pro Lys  
 725 730 735

Gly Gly Ile Glu Gly Phe Cys Gln Lys Leu Trp Thr Leu Ile Ser Ile  
 740 745 750

Ser Ala Ile His Leu Ala Ala Val Lys Ile Gly Val Arg Val Thr Ala  
 755 760 765

Met Val Gln Gly Asp Asn Gln Ala Ile Ala Val Thr Thr Arg Val Pro  
 770 775 780

Asn Asn Tyr Asp Tyr Lys Val Lys Lys Glu Ile Val Tyr Lys Asp Val  
 785 790 795 800

Val Arg Phe Phe Asp Ser Leu Arg Glu Val Met Asp Asp Leu Gly His  
 805 810 815

Glu Leu Lys Leu Asn Glu Thr Ile Ile Ser Ser Lys Met Phe Ile Tyr  
 820 825 830

Ser Lys Arg Ile Tyr Tyr Asp Gly Arg Ile Leu Pro Gln Ala Leu Lys  
 835 840 845

Ala Leu Ser Arg Cys Val Phe Trp Ser Glu Thr Ile Ile Asp Glu Thr  
 850 855 860

Arg Ser Ala Ser Ser Asn Leu Ala Thr Ser Phe Ala Lys Ala Ile Glu  
 865 870 875 880

Asn Gly Tyr Ser Pro Val Leu Gly Tyr Val Cys Ser Ile Phe Lys Asn  
 885 890 895

Ile Gln Gln Leu Tyr Ile Ala Leu Gly Met Asn Ile Asn Pro Thr Ile  
 900 905 910

Thr Gln Asn Ile Lys Asp Gln Tyr Phe Arg Asn Ile His Trp Met Gln  
 915 920 925

Tyr Ala Ser Leu Ile Pro Ala Ser Val Gly Gly Phe Amn Tyr Met Ala  
 930 935 940

Met Ser Arg Cyn Phe Val Arg Amn Ile Gly Asp Pro Thr Val Ala Ala  
 945 950 955 960

Leu Ala Asp Ile Lys Arg Phe Ile Lys Ala Asn Leu Leu Asp Arg Gly  
 965 970 975

Val Leu Tyr Arg Ile Met Amn Gln Glu Pro Gly Glu Ser Ser Phe Leu  
 980 985 990

Asp Trp Ala Ser Asp Pro Tyr Ser Cys Asn Leu Pro Gln Ser Gln Amn  
 995 1000 1005

Ile Thr Thr Met Ile Lys Asn Ile Thr Ala Arg Asn Val Leu Gln  
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Asp Ser Pro Asn Pro Leu Leu Ser Gly Leu Phe Thr Ser Thr Met  
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Ile Glu Glu Asp Glu Glu Leu Ala Glu Phe Leu Met Asp Arg Arg  
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Ile Ile Leu Pro Arg Val Ala His Asp Ile Leu Asp Asn Ser Leu  
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Thr Gly Ile Arg Asn Ala Ile Ala Gly Met Leu Asp Thr Thr Lys  
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Ser Leu Ile Arg Val Gly Ile Ser Arg Gly Gly Leu Thr Tyr Asn  
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Leu Leu Arg Lys Ile Ser Asn Tyr Asp Leu Val Gln Tyr Glu Thr  
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Leu Ser Lys Thr Leu Arg Leu Ile Val Ser Asp Lys Ile Lys Tyr  
 1115 1120 1125

Glu Asp Met Cys Ser Val Asp Leu Ala Ile Ser Leu Arg Gln Lys  
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Met Trp Met His Leu Ser Gly Gly Arg Met Ile Asn Gly Leu Glu  
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Thr Pro Asp Pro Leu Glu Leu Leu Ser Gly Val Ile Ile Thr Gly  
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Ser Glu His Cys Arg Ile Cys Tyr Ser Thr Glu Gly Glu Ser Pro  
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Tyr Thr Trp Met Tyr Leu Pro Gly Asn Leu Asn Ile Gly Ser Ala  
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Glu Thr Gly Ile Ala Ser Leu Arg Val Pro Tyr Phe Gly Ser Val  
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Thr Asp Glu Arg Ser Glu Ala Gln Leu Gly Tyr Ile Lys Asn Leu  
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Ser Lys Pro Ala Lys Ala Ala Ile Arg Ile Ala Met Ile Tyr Thr  
 1235 1240 1245

Trp Ala Phe Gly Asn Asp Glu Ile Ser Trp Met Glu Ala Ser Gln  
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Ile Ala Gln Thr Arg Ala Asn Phe Thr Leu Asp Ser Leu Lys Ile  
 1265 1270 1275

Leu Thr Pro Val Thr Thr Ser Thr Asn Leu Ser His Arg Leu Lys  
 1280 1285 1290

Asp Thr Ala Thr Gln Met Lys Phe Ser Ser Thr Ser Leu Ile Arg  
 1295 1300 1305

Val Ser Arg Phe Ile Thr Ile Ser Asn Asp Asn Met Ser Ile Lys  
 1310 1315 1320

Glu Ala Asn Glu Thr Lys Asp Thr Asn Leu Ile Tyr Gln Gln Val  
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Met Leu Thr Gly Leu Ser Val Phe Glu Tyr Leu Phe Arg Leu Glu  
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Glu Ser Thr Gly His Asn Pro Met Val Met His Leu His Ile Glu  
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Asp Gly Cys Cys Ile Lys Glu Ser Tyr Asn Asp Glu His Ile Asn  
 1370 1375 1380

Pro Glu Ser Thr Leu Glu Leu Ile Lys Tyr Pro Glu Ser Asn Glu  
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Phe Ile Tyr Asp Lys Asp Pro Leu Lys Asp Ile Asp Leu Ser Lys  
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Leu Met Val Ile Arg Asp His Ser Tyr Thr Ile Asp Met Asn Tyr  
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Trp Asp Asp Thr Asp Ile Val His Ala Ile Ser Ile Cys Thr Ala  
 1430 1435 1440

Val Thr Ile Ala Asp Thr Met Ser Gln Leu Asp Arg Asp Asn Leu  
 1445 1450 1455

Lys Glu Leu Val Val Ile Ala Asn Asp Asp Asp Ile Asn Ser Leu  
 1460 1465 1470

Ile Thr Glu Phe Leu Thr Leu Asp Ile Leu Val Phe Leu Lys Thr  
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Phe Gly Gly Leu Leu Val Asn Gln Phe Ala Tyr Thr Leu Tyr Gly  
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Leu Lys Ile Glu Gly Arg Asp Pro Ile Trp Asp Tyr Ile Met Arg  
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Thr Leu Lys Asp Thr Ser His Ser Val Leu Lys Val Leu Ser Asn  
 1520 1525 1530

Ala Leu Ser His Pro Lys Val Phe Lys Arg Phe Trp Asp Cys Gly  
 1535 1540 1545

Val Leu Asn Pro Ile Tyr Gly Pro Asn Thr Ala Ser Gln Asp Gln  
 1550 1555 1560

Val Lys Leu Ala Leu Ser Ile Cys Glu Tyr Ser Leu Asp Leu Phe  
 1565 1570 1575

Met Arg Glu Trp Leu Asn Gly Ala Ser Leu Glu Ile Tyr Ile Cys  
 1580 1585 1590

Asp Ser Asp Met Glu Ile Ala Asn Asp Arg Arg Gln Ala Phe Leu  
 1595 1600 1605

Ser	Arg	His	Leu	Ala	Phe	Val	Cys	Cys	Leu	Ala	Glu	Ile	Ala	Ser
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Phe	Gly	Pro	Asn	Leu	Leu	Asn	Leu	Thr	Tyr	Leu	Glu	Arg	Leu	Asp
1625						1630					1635			
Glu	Leu	Lys	Gln	Tyr	Leu	Asp	Leu	Asn	Ile	Lys	Glu	Asp	Pro	Thr
1640						1645					1650			
Leu	Lys	Tyr	Val	Gln	Val	Ser	Gly	Leu	Leu	Ile	Lys	Ser	Phe	Pro
1655						1660					1665			
Ser	Thr	Val	Thr	Tyr	Val	Arg	Lys	Thr	Ala	Ile	Lys	Tyr	Leu	Arg
1670						1675					1680			
Ile	Arg	Gly	Ile	Asn	Pro	Pro	Glu	Thr	Ile	Glu	Asp	Trp	Asp	Pro
1685						1690					1695			
Ile	Glu	Asp	Glu	Asn	Ile	Leu	Asp	Asn	Ile	Val	Lys	Thr	Val	Asn
1700						1705					1710			
Asp	Asn	Cys	Ser	Asp	Asn	Gln	Lys	Arg	Asn	Lys	Ser	Ser	Tyr	Phe
1715						1720					1725			
Trp	Gly	Leu	Ala	Leu	Lys	Asn	Tyr	Gln	Val	Val	Lys	Ile	Arg	Ser
1730						1735					1740			
Ile	Thr	Ser	Asp	Ser	Glu	Val	Asn	Glu	Ala	Ser	Asn	Val	Thr	Thr
1745						1750					1755			
His	Gly	Met	Thr	Leu	Pro	Gln	Gly	Gly	Ser	Tyr	Leu	Ser	His	Gln
1760						1765					1770			
Leu	Arg	Leu	Phe	Gly	Val	Asn	Ser	Thr	Ser	Cys	Leu	Lys	Ala	Leu
1775						1780					1785			
Glu	Leu	Ser	Gln	Ile	Leu	Met	Arg	Glu	Val	Lys	Lys	Asp	Lys	Asp
1790						1795					1800			
Arg	Leu	Phe	Leu	Gly	Glu	Gly	Ala	Gly	Ala	Met	Leu	Ala	Cys	Tyr
1805						1810					1815			
Asp	Ala	Thr	Leu	Gly	Pro	Ala	Ile	Asn	Tyr	Tyr	Asn	Ser	Gly	Leu
1820						1825					1830			

86

His Leu Ala Arg Glu Phe Leu Ser Thr Pro Asp Leu Thr Asn Ile  
 2060 2065 2070

Asn Asn Ile Ile Gln Ser Phe Thr Arg Thr Ile Lys Asp Val Met  
 2075 2080 2085

Phe Glu Trp Val Asn Ile Thr His Asp Asn Lys Arg His Lys Leu  
 2090 2095 2100

Gly Gly Arg Tyr Asn Leu Phe Pro Leu Lys Asn Lys Gly Lys Leu  
 2105 2110 2115

Arg Leu Leu Ser Arg Arg Leu Val Leu Ser Trp Ile Ser Leu Ser  
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Leu Ser Thr Arg Leu Leu Thr Gly Arg Phe Pro Asp Glu Lys Phe  
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Glu Asn Arg Ala Gln Thr Gly Tyr Val Ser Leu Ala Asp Ile Asp  
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Leu Glu Ser Leu Lys Leu Leu Ser Arg Asn Ile Val Lys Asn Tyr  
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Lys Glu His Ile Gly Leu Ile Ser Tyr Trp Phe Leu Thr Lys Glu  
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Val Lys Ile Leu Met Lys Leu Ile Gly Gly Val Lys Leu Leu Gly  
 2195 2200 2205

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Tyr Glu Tyr Asp Asn Glu Phe Asp Ile Asp  
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44

<210> 19

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33

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20

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20

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agagtattaa taaaacc

17

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<213> Artificial Sequence

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<223> HMPV strain 83 gene end consensus sequence with alternative assignments.

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10

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17

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46

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13

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gatgtgggta caacaactgc agtgacaccc tcatcattgc aacaagaaat aacactgttg 180  
tgtggagaaa ttctgtatgc taaacatgct gactacaaat atgctgcaga aataggaata 240  
caatatatta gcacagcttt aggatcagag agagtgcagc agattctgag gaactcaggc 300  
agtgaagtcc aagtggctctt aaccagaacg tactctctgg ggaaaattaa aaacaataaa 360  
ggagaagatt tacagatggt agacatacac ggggtagaga agagctgggt agaagagata 420  
gacaaagaag caaggaaaac aatggcaacc ttgcttaagg aatcatcagg taatatccca 480  
caaatcaga ggccttcagc accagacaca ccataatct tattatgtgt aggtgcctta 540  
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